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OF
SCIENTIFIC PAPERS
1800—1900

SUBJECT INDEX

VOLUME III

PHYSICS

PART I

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ROYAL SOCIETY OF LONDON

CATALOGUE

OF

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1800-1900

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VOLUME III

PHYSICS

PART I

GENERALITIES, HEAT, LIGHT, SOUND

CAMBRIDGE :

AT THE UNIVERSITY PRESS

1912

ROYAL SOCIETY OF LONDON
CATALOGUE
OF
SCIENTIFIC PAPERS
1800-1900

ARRANGED FOR A COMMITTEE OF THE ROYAL SOCIETY
UNDER THE SUPERINTENDENCE OF

HERBERT M^CLEOD, LL.D., F.R.S.

DIRECTOR OF THE CATALOGUE

with the assistance of

**ALICE EVERETT, M.A., R. HARGREAVES, M.A.,
AND W. MARSHALL WATTS, D.Sc.**

PART I
GENERALITIES, 1800-1850

CAMBRIDGE
AT THE UNIVERSITY PRESS
1911

PREFACE

IN the Preface to the Volume forming the Subject Index to the papers on Pure Mathematics for the nineteenth century, published in 1908, an outline of the history of the Royal Society's Catalogue of Scientific Papers is given; it is not necessary to repeat that account.

Volume II of the Subject Index, dealing with the papers on Mechanics, was published in 1909.

The present volume deals with the papers on Physics, as classified in the schedule of the International Catalogue of Scientific Literature. As it was found that the number of entries in this subject was too large for a single volume, the Committee decided that it should be published in two Parts, the first volume containing the entries classed under Generalities, Heat, Light and Sound, and the second those on Electricity and Magnetism. Part I contains 33344 entries referring to the papers contained in 1261 serial publications.

This order differs from that of the International Catalogue, in which Sound follows Electricity and Magnetism; the Registration Numbers are here retained, but the numbers 8990 to 9520, dealing with Sound, are interpolated between 4470 and 4900.

The Index titles were prepared in the same manner as those for Volumes I and II. Papers published from 1884 to 1900 inclusive were consulted by Referees familiar with the subjects, so that the Index titles were made from the contents of the papers and not merely from the headings. For the years from 1800 to 1883, it had been intended that the Index entries should be made from the titles in the published twelve volumes of the Catalogue arranged according to Authors' names; but it has been found necessary in a large number of cases to refer to the original papers, as the headings of the papers were not sufficiently definite to enable the Referees to classify the contents.

With the object of expediting the publication of the Physics volume, three of the Referees who assisted in the preparation of the Index titles were invited to help in sorting the slips for the Press. Mr R. Hargreaves

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undertook the section on Heat, Dr W. Marshall Watts that on Light and Miss Alice Everett that on Sound.

The subjects are arranged under the registration numbers adopted in the International Catalogue of Scientific Literature; a copy of Schedule C (Physics) of that Catalogue, as revised in 1905, is prefixed to the Index, with indication of the pages on which the titles for the different sections occur. It has occasionally been found convenient, in order to save repetition in printing, to group entries under a sub-heading which is not contained in the International Catalogue Schedule. Where this has been done the sub-heading is printed in italics. In some of these cases the words of the sub-heading are understood to exist before the entries following them, and consequently these entries commence with small letters. These minor classifications, being often made mechanically on the basis of the explicit mention of the sub-heading, are not to be taken as exhaustive; cognate entries may be found elsewhere under the same main heading. The unit of classification is thus the complete numbered heading.

At the end of the volume will be found an alphabetical index to the subdivisions under which the subject titles have been arranged; this will much facilitate reference. The index also contains references to important subjects included within some of the subdivisions but without separate headings.

The entries in the Index are arranged so that reference can be made, if necessary, to the complete titles in the Catalogue of Scientific Papers. Generally the author's name together with the date will indicate the volume in which the title of the paper may be found in full. But these clues are insufficient when the paper is anonymous, or occurs in Volume XII or in the additions to Volume VI. They are also at fault for titles marked with an asterisk showing that they belong to previous volumes; in these cases the number of the volume is given in the Index entry in small Roman numerals within brackets. The references have been made as short as possible; thus the number of only the initial page of each paper has been given; but the length of the paper may be found by reference to the Catalogue of Authors.

When an error has been found in an author's name in the Catalogue, it is corrected in the Index and a reference made to the error.

The Index contains references to some papers, of dates earlier than 1884, which were omitted in previous volumes of the Catalogue; these are indicated

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by an asterisk placed before the date. The full titles of these papers will be given in the continuation of the Catalogue of Authors.

When an author's personal name does not appear in the original heading of a paper, no attempt has been made to find the name for the Index; but this will be done for the Catalogue of Authors.

Entries on the same subject are arranged, so far as possible, in order of date irrespective of the authors' names, with the endeavour to present the subject in the historical form. This grouping of the entries, involving modifications of titles prepared by different Referees, or by the same Referee at different times, has been one of the most difficult problems in the preparation of the Index.

The abbreviations used in the Royal Society Catalogue for the names of the serials have been further shortened for the Index. As the abbreviations are not uniform in all the volumes, it will be found that the same journal may be indicated by several different abbreviations; but in each case the one selected is that which was used in the volume in which the title of the paper occurs.

In the case of serials commencing since 1883, the abbreviations adopted in the International Catalogue have been used as a guide.

The list of serials will, as in the case of Pure Mathematics, be a valuable feature of the Index. It contains the names of 1261 serials from which the entries in the Index have been taken. Each title is preceded by the abbreviation which represents the serial in the Index; the date of commencement of the serial is given, and if it is extinct the date of the last volume is added. There are appended symbols representing the names of thirty British Libraries in some of which the serials may be found; where the set is incomplete the symbol is followed by *i*. The information from which this list has been compiled was obtained, in the first instance, from published catalogues; subsequently the list was submitted to the custodians of many of the libraries, who kindly marked many serials which had not been found in the catalogues used. The thanks of the Committee for this valuable assistance are due to Mr F. Jenkinson of the Cambridge University Library, the late Mr E. W. B. Nicholson and Mr F. Madan of the Bodleian Library, the Librarian of the Radcliffe Library, the Librarian of the Cambridge Philosophical Society, Mr F. W. Clifford of the Chemical Society, to Mr R. Lloyd Praeger for obtaining information from the five Libraries in Dublin,

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Mr J. Hardy of the Royal Society of Edinburgh, Mr C. V. Crook of the Geological Museum, Mr Rupert Jones of the Geological Society, Mr J. Knight of the Royal Philosophical Society, Glasgow, Mr F. C. Nicholson of the University, Glasgow, Dr J. H. T. Tudsbery of the Institution of Civil Engineers, Dr B. Daydon Jackson, and Mr A. W. Kappel of the Linnean Society, the Librarian of the London Mathematical Society, Mr J. W. Knapman of the Pharmaceutical Society, Mr E. W. Hulme of the Patent Office Library, Mr W. H. Wesley of the Royal Astronomical Society, Mr F. Allen of the Royal Geographical Society, Mr R. W. Chambers of University College, London, Mr L. W. Fulcher of the Science Library, Science Museum, South Kensington, Dr W. N. Shaw, F.R.S., Director of the Meteorological Office, and Mr V. G. Plarr, Librarian of the Royal College of Surgeons.

Although much care has been expended in making this list as accurate as possible, it is probable that some errors will still be found, and the Director will be thankful to any one who will send corrections: portions of the list will be required for the subsequent volumes of the Index.

The following Referees have assisted at various times in the preparation of the Subject Index in Physics: Miss Alice Everett, Miss Burna Pool, Mr R. J. Dallas, Mr W. A. Davis, Mr R. Hargreaves, Dr R. A. Lehfeldt, Mr W. Lowson, Mr H. E. Schmitz, Mr J. H. Shaxby and Dr W. Marshall Watts. The Committee is indebted to them for much valuable help.

Dr W. Marshall Watts has given special assistance and supervision in the preparation of the Index titles. To him, and to Miss Bremner and the other members of the Catalogue Staff of the Royal Society, thanks are due for careful and conscientious work.

The Committee is indebted to the authorities of the British Museum, of the Natural History Museum, of the Royal College of Surgeons, of the Patent Office and of the Meteorological Office for facilities given to the type writers and revisers of the Catalogue staff in copying titles of papers from the books in the libraries, and also to the Cambridge University Library, the Chemical Society, the Geological Society, the Linnean Society, the Royal Astronomical Society, the Royal Geographical Society and the Alpine Club for the loan of books for the preparation of the Catalogue.

Besides these Libraries others have been consulted and the Committee gratefully acknowledges the assistance that has been received.

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The Committee desires to renew the record of its gratitude to the late Dr Ludwig Mond, F.R.S., for his generosity in providing funds for carrying on the work of the Catalogue, in which he took so keen an interest. Without his help it would hardly have been possible to proceed with the Catalogue in its present complete form; by his decease the members of the Committee have been deprived of a stimulating colleague who had been active in the planning of the work almost from the beginning.

The final section of the Catalogue of Scientific Papers arranged according to Authors' names, that for the period 1884 to 1900, is in active preparation. The material has now been all collected and it is hoped that the printing may soon be commenced.

The Syndics of the Cambridge University Press have undertaken the complete risk of printing and publishing, as regards both the Catalogue of Scientific Papers and the Subject Index. It will be the care of the Committee, and it is hoped of the Scientific world generally, to use their best endeavours that this public-spirited action shall not result in financial loss.

The thanks of the Committee are due to the officials of the Cambridge Press for their unfailing courtesy in the discharge of a complex task.

October, 1912.

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SUBJECT INDEX OF PHYSICS

LIST OF SERIAL PUBLICATIONS

WITH THE ABBREVIATIONS OF THEIR TITLES USED IN THE INDEX, AND
LIBRARIES WHERE THE SERIALS CAN BE CONSULTED.

The date following the title of a serial indicates the year of publication of the first volume; if a second date is given it marks the termination of the serial.

The letters following the dates indicate libraries where the serials are to be found: if the serial is incomplete, the symbol of the library is followed by *i*.

| | | | |
|------------|---|-------------|---|
| B.M. | British Museum. | Linn.S. | Linnean Society. |
| Camb.P.S. | Cambridge Philosophical Library. | Math.S. | Mathematical Society. |
| Camb.U. | Cambridge University Library. | M.O. | Meteorological Office, South Kensington. |
| Chem.S. | Chemical Society. | N.H.M. | Natural History Museum. |
| Dub.N.L.I. | National Library of Ireland, Dublin. | Oxon.B. | Bodleian, Oxford. |
| Dub.R.C.S. | Royal College of Science, Dublin. | Oxon.B.(R.) | Deposited in Radcliffe. |
| Dub.R.D.S. | Royal Dublin Society. | Oxon.R. | Radcliffe, Oxford. |
| Dub.R.I.A. | Royal Irish Academy, Dublin. | Pharm.S. | Pharmaceutical Society, London. |
| Dub.T.C. | Trinity College, Dublin. | P.O. | Patent Office, London. |
| Edinb.R.S. | Royal Society of Edinburgh. | R.A.S. | Royal Astronomical Society. |
| Edinb.U. | Edinburgh University. | R.C.Surg. | Royal College of Surgeons. |
| Geol.M. | Geological Survey Museum, Jermyn St. | R.Geogr.S. | Royal Geographical Society. |
| Geol.S. | Geological Society. | R.S. | Royal Society. |
| Glasg.P.S. | Royal Philosophical Society of Glasgow. | S.K. | Science Museum Library, South Kensington. |
| Glasg.U. | Glasgow University. | U.C.L. | University College, London. |
| I.CE. | Institution of Civil Engineers, London. | | |

| | |
|-----------------------------------|---|
| A. Agn. | Annales Agronomiques... Paris. 1851; 1875— B.M.; Chem.S.i.; Linn.S.; Oxon.B.; P.O.i.; R.S.i. |
| Aarau Arch. Md. | Archiv der Medizin, Chirurgie, und Pharmacie. Aarau. 1816—17. R.S. |
| Aarau Mt. | Mittheilungen der Aargauischen Naturforschenden Gesellschaft. Aarau. 1878— N.H.M.; R.S.; S.K. |
| A. C. | Annales de Chimie [et de Physique], ou Recueil de Mémoires concernant la Chimie et les Arts qui en dépendent. Paris. 1789— B.M.; Camb.U.; Chem.S.; Dub.R.D.S.i.; Dub.T.C.i.; Edinb.R.S.; Edinb.U.; Glasg.U.; I.CE.; N.H.M.; Oxon.B.i.(R.); Pharm.S.; P.O.; R.C.Surg.; R.S.; S.K.; U.C.L. |
| A. C. Anal. | Annales de Chimie Analytique appliquée à l'Industrie, à l'Agriculture, à la Pharmacie et à la Biologie. Paris. 1896— Chem.S.i.; P.O. |
| Ac. Cæs. Leop. N. Acta ... | Nova Acta physico-medica Academiæ Cæs. Leopoldino-Carolinæ Naturæ Curiosorum. Erlangen, Bonn, Breslau. 1758— Camb.P.S.; Camb.U.; Chem.S.i.; Dub.T.C.; Edinb.R.S.i.; Edinb.U.; Geol.S.i.; Glasg.U.; Linn.S.i.; N.H.M.; Oxon.R.; Pharm.S.i.; R.A.S.i.; R.C.Surg.; R.S.; S.K.i.; U.C.L.i. |
| Acireale Ac. At. | See Ac. Nt. C. N. Acta and Cæs. Leop. Ac. N. Acta . Atti e Rendiconti dell' Accademia di Scienze, Lettere e Arti dei Zelanti e PP. dello Studio di Acireale. Acireale. 1890— Camb.P.S.i.; Geol.S.i.; N.H.M.i.; R.S.i. |

List of Serial Publications

- Ac. Nt. C. N. Acta** *See Ac. Cæs. Leop. N. Acta and Cæs. Leop. Ac. N. Acta.*
- A. Cond. Pon. Chauss.** Annales des Conducteurs des Ponts et Chaussées; Recueil de Mémoires, etc., concernant le Service de Conducteurs des Ponts et Chaussées. Paris.
1857— I.CE.i.; P.O.
- A. Cons. Arts et Mét.** Annales du Conservatoire des Arts et Métiers. Paris.
1861— B.M.; Camb.U.; Glasg.P.S.i.; I.CE.i.; Oxon.B.; P.O.; R.S.; S.K.i.
- A. C. Phm.** *See Far. A. Cons.*
Annales der Chemie und Pharmacie. Lemgo, Leipzig, Heidelberg.
1832— B.M.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Dub.R.C.S.i.; Edinb.R.S.i.; Edinb.U.; Glasg.P.S.; Glasg.U.i.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
- Acta Mth.** *See Lieb. A.*
Acta Mathematica. Stockholm.
1882— B.M.; Camb.P.S.; Camb.U.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Glasg.U.; Math.S.; Oxon.R.; R.A.S.; R.S.; U.C.L.
- Act. S. Helv.** Actes de la Société Helvétique des Sciences Naturelles. Lausanne, etc.
1825— B.M.i.; Edinb.R.S.i.; Linn.S.i.; N.H.M.; S.K.
- A. das Sc.** *See At. S. Elvet., Sch. Gs. Vh. and Sch. Nf. Gs. Vh.*
Annaes das Sciencias, etc. por huma Sociedade de Portuguezes residentes em Paris. Paris.
1818—27. B.M.; Camb.U.i.
- A. der Hydrog.** *See Far. A. das Sc.*
Annalen der Hydrographie und Maritimen Meteorologie. Herausgegeben von der Deutschen Seewarte in Hamburg. Berlin.
1875— [Continuation of: Hydrographische Mittheilungen, 1873—74.] B.M.; M.O.; P.O.i.; R.Geogr.S.
- A. di C.** Annali di Chimica. Milano.
1845—97. [Continued as: Annali di Farmacoterapia e Chimica, 1898—] B.M.; Camb.U.i.; Chem.S.i.; Pharm.S.i.; P.O.i.
- A. di Fm. e C.** *See Polli A.*
Annali di Farmacoterapia e Chimica. Milano, Bologna, etc.
1898— [Continuation of: Annali di Chimica, 1845—97.] B.M.; Camb.U.i.; Chem.S.; Glasg.P.S.i.; P.O.
- A. d'Ocul.** Annales d'Oculistique. Charleroi, Bruxelles, Paris.
1838— B.M.; Camb.U.i.; Oxon.R.i.; R.C.Surg.
- Aér.** L'Aéronaute. Bulletin Mensuel Illustré de la Navigation Aérienne. Paris.
1868— B.M.i.; P.O.; S.K.
- Aer. J.** The Aeronautical Journal. London.
1897— B.M.; Camb.U.i.; I.CE.i.; P.O.; R.S.; S.K.
- Aër. S. Rp.** Annual Reports of the Aeronautical Society of Great Britain. London.
1866—93. I.CE.i.; Oxon.B.; P.O.
- A. Gén. Civ.** Annales du Génie Civil; Recueil de Mémoires sur les Mathématiques pures et appliquées; l'Astronomie, la Chimie, la Physique, etc. Paris.
1862—80. B.M.; Camb.U.; Dub.R.C.S.i.; I.CE.; P.O.
- A. Gén. Sc. Ps.** Annales générales des Sciences Physiques. Bruxelles.
1819—21. Camb.U.; Glasg.U.; N.H.M.; R.C.Surg.; R.S.
- Ag. S. J.** Journal of the Royal Agricultural Society of England. London.
1840— B.M.; Camb.U.; Chem.S.; Dub.T.C.; Geol.M.; Geol.S.; Glasg.U.i.; I.CE.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- A. Hydrog.** Annales Hydrographiques. Recueil d'Avis, Instructions, Documents, et Mémoires relatifs à l'Hydrographie et à la Navigation. Paris.
1849— B.M.; Edinb.R.S.i.; M.O.i.; Oxon.B.; R.A.S.i.; R.Geogr.S.i.; R.S.i.
- A. Hyg. Pbl.** Annales d'Hygiène publique [et de Médecine légale]. Paris.
1829— B.M.; Camb.U.; Edinb.R.S.i.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; Oxon.R.; P.O.i.; R.C.Surg.
- Aix Ac. Mm.** { Mémoires de l'Académie des Sciences, Agriculture, Arts et Belles-Lettres. Aix.
- Aix Mm.** {
- Aix Mm. Ac.** { 1819— B.M.; Dub.R.I.A.; N.H.M.i.; Oxon.B.i.; R.S.i.
- Alb. I. T.** Transactions of the Albany Institute. Albany.
1830— B.M.; N.H.M.; R.S.; S.K.i.

List of Serial Publications

- Al. D. Nt. Ztg.** Allgemeine Deutsche Naturhistorische Zeitung. Dresden, Leipzig, Hamburg.
1846—47; 1855—57. B.M.; Glasg.P.S.i.; N.H.M.; R.S.; S.K.i.
- Allier Bil. S. Ém.** Bulletin de la Société d'Émulation du Département de l'Allier: Sciences, Arts, et Belles-Lettres. Moulins.
1846—64. B.M.; Glasg.P.S.i.; Oxon.B.; R.S.
- A. Lndw.** Annalen der Landwirthschaft in den K. Preuss. Staaten; herausg. vom Präsidium des K. Landes-Oecon.-Collegiums. Berlin.
1843—71. [Continued as: Landwirthschaftliche Jahrbücher, 1872—.] P.O.
- Am. Ac. Mm.** Memoirs of the American Academy of Arts and Sciences. Cambridge, Boston.
1785— B.M.i.; Camb.P.S.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Geol.S.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.R.; P.O.i.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
See Bost. Am. Ac. Mm.
- Am. Ac. P.** Proceedings of the American Academy of Arts and Sciences. Boston.
1846— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.i.; Edinb.R.S.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.i.; Linn.S.; Math.S.i.; N.H.M.; Oxon.R.; P.O.; R.A.S.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Am. As. P.** Proceedings of the American Association for the Advancement of Science. Washington, Salem.
1848— B.M.i.; Camb.P.S.i.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.; S.K.
- Am. C.** The American Chemist, a monthly Journal of theoretical Chemistry. New York.
1871—77. Chem.S.i.; N.H.M.; P.O.; Pharm.S.i.; S.K.i.
- Am. C. J.** American Chemical Journal. Baltimore.
1879— Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.i.; Glasg.P.S.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.; R.S.; S.K.
- A. Microgr.** Annales de Micrographie, spécialement consacrées à la Bactériologie, aux Protophytes et aux Protozoaires. Paris.
1888—98. Glasg.P.S.i.; Glasg.U.; N.H.M.; Oxon.R.
- Am. C. S. J.** The Journal of the American Chemical Society. New York, Easton, Pa.
1879— B.M.; Camb.P.S.; Chem.S.; Edinb.U.i.; Glasg.U.i.; N.H.M.; Pharm.S.; P.O.; S.K.; U.C.L.i.
- Am. Eng. & Railroad J.** American Engineer and Railroad Journal. New York.
1893— [Continuation of: The Railroad and Engineering Journal, 1887—92.] B.M.; I.CE.; P.O.
- Amici G. Tosc.** Giornale Toscano di Scienze Mediche, Fisiche, e Naturali; Amici, Bufalini, etc. Pisa.
1840—43. B.M.; Camb.U.i.; Glasg.P.S.i.; Oxon.B.
- Amiens Ac. Mm.** Mémoires de l'Académie des Sciences, Agriculture, Commerce, Belles-Lettres, et Arts du département de la Somme. Amiens.
- Amiens Mm. Ac.** 1835— B.M.; Camb.U.; Dub.T.C.i.; N.H.M.i.; Oxon.B.i.; R.S.i.
- Amiens Mm. Ac. Sc.** Transactions of the American Institute of Mining Engineers. Philadelphia, Easton, New York.
1871— Geol.S.; I.CE.; P.O.; S.K.
- A. Mines** Annales des Mines, ou Recueil des Mémoires sur l'exploitation des Mines, et sur les Sciences et les Arts qui s'y rapportent. Paris.
1817— [Continuation of: Journal des Mines, etc., 1794—1815.] B.M.; Camb.U.; Chem.S.i.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; I.CE.; N.H.M.; Oxon.B.(R.); P.O.; R.S.; S.K.
- Am. I. T.** [Reports and Transactions] of the American Institute of the City of New York. Albany.
1841— B.M.i.; I.CE.i.; P.O.i.; R.S.i.
- Am. J. Md. Sc.** American Journal of the Medical Sciences. Philadelphia.
1827— B.M.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.; Oxon.R.; R.C.Surg.; U.C.L.i.
- Am. J. Mth.** American Journal of Mathematics. Baltimore.
1878— B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.R.I.A.;

List of Serial Publications

- Dub.T.C.; Edinb.R.S.; Edinb.U.; Glasg.U.i.; I.CE.i.; Math.S.; Oxon.B.; Oxon.R.; R.A.S.; R.S.; S.K.; U.C.L.
- Am. J. Ot.**..... The American Journal of Otology. New York.
1879—82. Glasg.P.S.i.; R.S.
- Am. J. Phm.**..... American Journal of Pharmacy; published by the Philadelphia College of Pharmacy. Philadelphia.
1836— [Continuation of: Journal of the Philadelphia College of Pharmacy, 1830—35.] Chem.S.i.; Pharm.S.; P.O.i.; R.C.Surg.i.
- Am. J. Psychol.**..... The American Journal of Psychology. Baltimore, Worcester, Mass.
1888— B.M.; Edinb.U.; Oxon.B.; Oxon.R.; U.C.L.i.
- Am. J. Sc.**..... The American Journal of Science and Arts; Silliman. New Haven.
1818— B.M.; Camb.P.S.i.; Camb.U.; Chem.S.i.; Dub.N.L.I.i.; Dub.R.C.S.i.; Dub.T.C.i.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.
- See **Silliman J.**
- Am. Mcr. J.**..... The American Monthly Microscopical Journal. New York.
1880— Camb.U.; Dub.N.L.I.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.
- Am. Mcr. S. P.**..... Proceedings of the American Microscopical Society. Washington, Ithaca, N.Y.
1892—94. [Continuation of: Proceedings of the American Society of Microscopists, 1878—91.] [Continued as: Transactions of the American Microscopical Society, 1895—] Linn.S.; N.H.M.
- Am. Mcr. S. T.**..... Transactions of the American Microscopical Society. Lincoln, Buffalo.
1895— [Continuation of: Proceedings, etc., 1892—94.] Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.
- Am. Md. Ph. Reg.**..... The American Medical and Philosophical Register or Annals of Medicine, Natural History, Agriculture and the Arts. New York.
1810—14. B.M.; Edinb.U.i.; Geol.S.; R.C.Surg.; R.S.; U.C.L.
- Am. Met. J.**..... American Meteorological Journal. Detroit.
1884—96. B.M.i.; M.O.
- Am. Nt.**..... The American Naturalist. An illustrated magazine of Natural History. Philadelphia, Boston.
- Am. Ntlist.**..... 1868— B.M.; Camb.P.S.i.; Camb.U.; Edinb.R.S.i.; Edinb.U.i.; Geol.M.i.; Linn.S.i.; N.H.M.; Oxon.R.; R.Geogr.S.i.; R.S.i.; S.K.
- Am. Oph. S. T.**..... Transactions of the American Ophthalmological Society. New York, Boston, Hartford.
1865— Glasg.P.S.i.; Oxon.R.; R.C.Surg.
- Am. Phm. As. P.**..... Proceedings of the American Pharmaceutical Association. Philadelphia.
1853— Pharm.S.
- Am. Ph. S. P.**..... Proceedings of the American Philosophical Society. Philadelphia.
1840— Camb.P.S.; Camb.U.i.; Chem.S.i.; Dub.R.I.A.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; Math.S.i.; M.O.; N.H.M.i.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Am. Ph. S. T.**..... Transactions of the American Philosophical Society. Philadelphia.
1771— B.M.i.; Camb.P.S.; Camb.U.i.; Chem.S.i.; Dub.R.I.A.; Edinb.R.S.; Geol.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.i.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- See **Philad. T.**
- Am. Pol. J.**..... The American Polytechnic Journal. Washington.
1853—54. B.M.; P.O.
- Am. S. CE. T.**..... Transactions of the American Society of Civil Engineers. New York.
1871— I.CE.; P.O.; S.K.i.; U.C.L.i.
- Am. S. Mcr. P.**..... Proceedings of the American Society of Microscopists. Indianapolis, etc.
1878—91. [Continued as: Proceedings of the American Microscopical Society, 1892—94.] Linn.S.; N.H.M.
- Amst. Ak. Jb.**..... Jaarboek van de Koninklijke Akademie van Wetenschappen gevestigd te Amsterdam. Amsterdam.
1857— B.M.; Camb.P.S.; Dub.R.D.S.; Dub.T.C.; Edinb.R.S.i.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.; N.H.M.; R.A.S.i.; R.Geogr.S.; R.S.; U.C.L.i.
- See **Amst. Jb.**

List of Serial Publications

- Amst. Ak. P.** Koninklijke Akademie van Wetenschappen te Amsterdam. Proceedings of the Section of Sciences. Amsterdam.
1899— Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Glasg.P.S.; Glasg.U.; Oxon.B.; R.A.S.; R.Geogr.S.; R.S.; S.K.
- Amst. Ak. Vh.** Verhandeligen der Koninklijke Akademie van Wetenschappen. Amsterdam.
1854— Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.; R.A.S.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.i.; U.C.L.i.
- Amst. Ak. Vs.** Verslagen der Zittingen van de Wis- en Natuurkundige Afdeling der Koninklijke Akademie van Wetenschappen. 1893, 1894. [*Continuation of*: Verslagen en Mededeelingen, 1853—92.]
Verslagen van de Zittingen der Wis- en Natuurkundige Afdeling van de Koninklijke Akademie van Wetenschappen. 1895, 1896.
Koninklijke Akademie van Wetenschappen te Amsterdam. Verslagen van de Gewone Vergaderingen der Wis- en Natuurkundige Afdeling. Amsterdam.
1897— B.M.; Camb.P.S.; Camb.U.; Dub.T.C.; Edinb.R.S.; Glasg.P.S.; Glasg.U.; N.H.M.; R.A.S.; R.Geogr.S.; R.S.; S.K.i.
- Amst. Ak. Vs. M.** Verslagen en Mededeelingen der Koninklijke Akademie van Wetenschappen. Afdeling Natuurkunde. Amsterdam.
1853—92. [*Continued as*: Verslagen der Zittingen, etc., 1893—.]
B.M.; Camb.P.S.; Camb.U.; Dub.T.C.; Edinb.R.S.; Glasg.P.S.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.i.; R.A.S.i.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- See Amst. Vs. Ak.*
- Amst. Ak. Wet. P.** Processen-Verbaal van de Gewone Vergaderingen der Koninklijke Akademie van Wetenschappen. Afdeling Natuurkunde. Amsterdam.
1865—84. Dub.R.D.S.; Linn.S.i.; R.A.S.; R.S.
- Amst. I.** Het Instituut. Amsterdam.
1841—46. B.M.; Edinb.R.S.i.; S.K.
- Amst. Jb.**) *See Amst. Ak. Jb.*
- Amst. Jb. Ak.**)
- Amst. N. Vh.** Nieuwe Verhandeligen der eerste Klasse van het Koninklijk Nederlandsche Instituut van Wetenschappen, Letterkunde, en Schoone Kunsten te Amsterdam. Amsterdam.
1827—52. [*Continuation of*: Verhandeligen, etc., 1812—25.] B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.; Glasg.U.i.; Linn.S.; N.H.M.; R.S.; S.K.
- Amst. Ts. Nt. Wet.** Tijdschrift voor Natuurkundige Wetenschappen en Kunsten. Amsterdam.
1810—11. Camb.P.S.; R.S.
- Amst. Ts. Ws. Nt. Wet.** Tijdschrift voor de Wis- en Natuurkundige Wetenschappen, Letterkunde, en Schoone Kunsten te Amsterdam. Amsterdam.
1847—52. B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; Linn.S.; Oxon.B.; R.S.
- Amst. Vh.**)
- Amst. Vh. Ak.**) Verhandeligen der Eerste Klasse van het Koninklijk Nederlandsche Instituut van Wetenschappen, Letterkunde, en Schoone Kunsten te Amsterdam. Amsterdam.
1812—25. [*Continued as*: Nieuwe Verhandeligen, etc., 1827—52.]
B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.; Glasg.U.i.; N.H.M.; Oxon.B.; R.S.; S.K.
- Amst. Vs. Ak.** *See Amst. Ak. Vs. M.*
- A. Mt.** Annali di Matematica pura ed applicata...; Tortolini. Roma, Milano.
1858— B.M.; Camb.U.i.; Dub.R.D.S.; Dub.T.C.; Edinb.U.; Glasg.U.i.; Oxon.B.(R.); R.S.; U.C.L.
- See Tortolini A.*
- A. Mth.** Annals of Mathematics. University of Virginia. Charlottesville, Va.
1884— Camb.P.S.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.; Math.S.i.; Oxon.B.; S.K.i.
- Anal.** The Analyst, including the Proceedings of the Society of Public Analysts. London.
1877— B.M.; Camb.U.i.; Chem.S.; Edinb.U.i.; Geol.S.i.; Glasg.P.S.; Glasg.U.i.; Pharm.S.; P.O.; R.S.i.; U.C.L.i.
- Angers Ac. Sc. Mm.** Mémoires de l'Académie des Sciences et Belles-Lettres d'Angers. Angers.

List of Serial Publications

- 1890—95. [*Continuation of*: Mémoires de la Société Académique de Maine et Loire, 1857—83.] Glasg.P.S.i.; N.H.M.
Angers S. Sc. Bll. Bulletin de la Société d'Études Scientifiques d'Angers. Angers.
 1872— B.M.; N.H.M.
A. NH. Annals of Natural History, or Magazine of Zoology, Botany, and Geology. London.
 1838—40. [*Continuation of*: Magazine of Zoology and Botany, 1837—38.] [*Continued as*: Annals and Magazine of Natural History, 1841—] B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.i.; Geol.M.; Geol.S.i.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
Anhalt Vh. Nt. Vr. Verhandlungen des naturhistorischen Vereins für Anhalt in Dessau. Dessau.
 1840—70.
An. Mét. Fr. Annuaire Météorologique de la France. Paris.
 1849—52. [*Continued as*: Annuaire de la Société Météorologique de France, 1853—] B.M.; Camb.U.; Dub.T.C.; Glasg.U.i.; M.O.; R.S.
See **Fr. An. Mét.**
Anvers A. S. Md. Annales de la Société de Médecine d'Anvers. Anvers.
 1841—56. Glasg.P.S.i.; R.S.
Anvers J. Phm. Journal de Pharmacie. Publié par la Société de Pharmacie d'Anvers. Anvers.
 1845— B.M.; Oxon.R.; Pharm.S.i.
Ap. I. J. The Journal of the Anthropological Institute of Great Britain and Ireland. London.
 1872— B.M.; Camb.P.S.i.; Camb.U.; Dub.N.L.I.; Edinb.R.S.; Edinb.U.; Glasg.U.; N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.
A. Pon. Chaus. Annales des Ponts et Chaussées. Mémoires et documents relatifs à l'Art des Constructions et au Service de l'Ingénieur. Paris.
 1831— B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.; P.O.; R.S.i.
See **Par. A. Pon. Chaus.**
A. Ps. Annalen der Physik; Drude. Leipzig.
 1900— [*Continuation of*: Annalen der Physik und Chemie, 1824—99.] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Edinb.R.S.; Edinb.U.; Glasg.P.S.; Glasg.U.; I.CE.; N.H.M.; Pharm.S.; P.O.; R.S.; S.K.; U.C.L.
A. Ps. C. Annalen der Physik und Chemie; Poggendorff, Wiedemann. Leipzig.
 1824—99. [*Continuation of*: Annalen der Physik; Gilbert, 1799—1824.] [*Continued as*: Annalen der Physik; Drude, 1900—] B.M.; Camb.P.S.i.; Camb.U.; Chem.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; N.H.M.; Oxon.B.(R.); Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
See **Pogg. A.**
A. Ps. C. Beibl. Beiblätter zu den Annalen... Leipzig.
 1877— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Glasg.U.; I.CE.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.S.; S.K.; U.C.L.
Arch. An. Mcr. Archives d'Anatomie Microscopique. Paris.
 1897— B.M.; Glasg.P.S.i.; Glasg.U.i.; N.H.M.; Oxon.R.
Arch. An. Pl. Archiv für Anatomie, Physiologie, und Wissenschaftliche Medicin; Müller, Reichert, Du Bois-Reymond. Berlin.
 1834—76. [*Continuation of*: Archiv für Anatomie und Physiologie, 1826—32.] [*Continued as*: Archiv für Anatomie und Physiologie, 1877—] B.M.; Camb.U.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
See **Müller Arch. and Reichert Arch.**
Arch. An. Pl. (An. Ab.)... Archiv für Anatomie und Physiologie. Anatomische Abtheilung, Archiv für Anatomie und Entwicklungsgeschichte. Leipzig.
 1877— [*Continuation of*: Archiv für Anatomie, Physiologie, und Wissenschaftliche Medicin, 1834—76.] Camb.P.S.; Camb.U.; Edinb.U.; Glasg.U.; N.H.M.i.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.

List of Serial Publications

- Arch. An. Pl. (Pl. Ab.)** ... Archiv für Anatomie und Physiologie. Physiologische Abtheilung. Archiv für Physiologie. Leipzig.
1877— [Continuation of: Archiv für Anatomie, Physiologie, und Wissenschaftliche Medicin, 1834—76.] Camb.P.S.; Camb.U.; Edinb.U.; Glasg.U.; N.H.M.i.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Arch. Augenh.** Archiv für Augenheilkunde. Wiesbaden.
1879— [Continuation of: Archiv für Augen- und Ohrenheilkunde, 1869—78.] B.M.; Camb.U.; Glasg.P.S.i.
- Arch. de l'Électr.** Archives de l'Électricité; A. de la Rive. Genève.
1841—45. B.M.; Camb.U.; P.O.; R.C.Surg.; R.S.i.
- Arch. de Pl.** Archives de Physiologie normale et pathologique. Paris.
1868—98. [Continuation of: Journal de la Physiologie, 1858—65.] [Continued as: Journal de Physiologie et de Pathologie Générale, 1899—] B.M.; Camb.U.; Edinb.U.; Glasg.P.S.i.; Oxon.R.; R.C.Surg.; R.S.; U.C.L.
- Arch. f. Oph.** Archiv für Ophthalmologie. Berlin, Leipzig.
1854— B.M.; Camb.U.; Edinb.U.; Glasg.U.; Oxon.R.; R.C.Surg.; R.S.i.
- Arch. Gén. Md.** Archives Générales de Médecine. Paris.
1823— B.M.; Camb.U.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; Oxon.R.; R.C.Surg.
- Arch. Hyg.** Archiv für Hygiene. München, Leipzig.
1893— Camb.U.; Chem.S.i.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; Oxon.R.; P.O.i.; R.C.Surg.
- Arch. Md. Exp.** Archives de Médecine Expérimentale et d'Anatomie Pathologique. Paris.
1889— Camb.U.i.; Edinb.U.; Glasg.U.; Oxon.R.; R.C.Surg.; R.S.
- Arch. Md. Nv.** Archives de Médecine Navale. Paris.
1864— B.M.; Edinb.U.i.; Glasg.P.S.i.; R.C.Surg.
- Arch. Md. Phm. Mil.** ... Archives de Médecine et de Pharmacie Militaires. Paris.
1883— [Continuation of: Recueil de Mémoires de Médecine, de Chirurgie, et de Pharmacie Militaires, 1815—82.] B.M.; R.C.Surg.i.
- Arch. Mkr. An.** Archiv für mikroskopische Anatomie. Bonn.
1865— B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Edinb.U.; Glasg.U.; Linn.S.; N.H.M.i.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Arch. Mth. Ntvd.** Archiv for Mathematik og Naturvidenskab. Kristiania.
1876— B.M.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.U.i.; Math.S.i.; N.H.M.; Oxon.B.; Oxon.R.i.; R.S.
- Arch. Mth. Ps.** Archiv der Mathematik und Physik; Grunert. Greifswald, Leipzig.
1841— B.M.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Edinb.U.; Glasg.U.; Math.S.i.; Oxon.B.(R.); R.S.; U.C.L.i.
- Arch. Néerl.** See **Grunert Arch.**
Archives Néerlandaises des Sciences Exactes et Naturelles. La Haye, Harlem.
1866— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.M.i.; Geol.S.i.; Glasg.P.S.; Glasg.U.i.; Linn.S.; Math.S.; N.H.M.; Oxon.R.; P.O.; R.S.; S.K.; U.C.L.i.
- Arch. Ohrh.** Archiv für Ohrenheilkunde. Würzburg.
1864— R.C.Surg.
- Arch. Oph.** Archives of Ophthalmology. New York.
1879— [Continuation of: Archives of Ophthalmology and Otology, 1869—78.] B.M.i.; Glasg.U.i.; Oxon.R.; R.C.Surg.
- Arch. Oph. Ot.** Archives of Ophthalmology and Otology. New York.
1869—78. [Continued as: Archives of Ophthalmology, 1879—, and Archives of Otology, 1879—] B.M.; Glasg.P.S.i.; Glasg.U.i.; Oxon.R.; R.C.Surg.
- Arch. Ot.** Archives of Otology. New York.
1879— [Continuation of: Archives of Ophthalmology and Otology, 1869—78.] B.M.i.; Glasg.U.i.; Oxon.R.; R.C.Surg.
- Arch. Phm.** Archiv des Apothekervereins im nördlichen Deutschland. Archiv der Pharmacie. Schmalkalden, Lemgo, Hannover, etc.
1822— Chem.S.i.; Pharm.S.i.; P.O.; R.C.Surg.i.
- Arch. Sc.** Archives of Science and Transactions of the Orleans County Society of Natural Sciences. Newport, U.S.

List of Serial Publications

- 1870—74. B.M.; Geol.S.i.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; R.S.
Arch. Sc. Ps. Nt...... Bibliothèque Universelle. Archives des Sciences Physiques et Naturelles. Genève.
 1846— [Continuation of: Bibliothèque Universelle des Sciences, etc., 1816—45.] B.M.; Camb.U.; Chem.S.i.; Dub.N.L.I.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.; Edinb.U.; Glasg.U.; I.CE.i.; M.O.i.; N.H.M.; Oxon.B.; P.O.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.
See Bb. Un. Arch.
Arch. Z. Exp...... Archives de Zoologie Expérimentale et Générale. Paris.
 1872— B.M.; Camb.U.; Dub.N.L.I.; Dub.R.D.S.; Edinb.R.S.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
Arcueil Mm...... Mémoires de Physique et de Chimie de la Société d'Arcueil. Paris.
Arcueil Mm. Ps...... { 1807—17. B.M.; Camb.U.; Chem.S.i.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.; Oxon.B.; P.O.; R.C.Surg.; R.S.; S.K.
Arg. S. Ci. A...... Anales de la Sociedad Científica Argentina. Buenos Aires.
 1876— B.M.i.; I.CE.i.; N.H.M.
Arnhem Ntk...... Naturkundig Tijdschrift, inhoudende Phijsica, Chemie, Pharmacie, Natuurlijke Historie en Literatuur. Arnhem.
 1843—60. N.H.M.
Arras Mm. S. R...... Mémoires de la Société Royale d'Arras, pour l'Encouragement des Sciences, etc. Arras.
 1817— Camb.U.; Glasg.P.S.i.; Oxon.B.i.
As...... L'Astronomie. Revue d'Astronomie populaire, de Météorologie et de Physique du Globe. Paris.
 1882—94. B.M.; Camb.U.i.; Edinb.R.S.; R.A.S.; R.S.i.; S.K.
As. & Asps...... Astronomy and Astrophysics. Northfield, Minn.
 1892—94. [Continuation of: The Sidereal Messenger, 1883—91.]
 [Continued as: The Astrophysical Journal, 1895—] B.M.; Camb.P.S.i.; Dub.N.L.I.i.; R.A.S.; R.S.; S.K.
A. Sc. Lomb. Ven...... Annali delle Scienze del Regno Lombardo-Veneto. Padova, Venezia.
 1831—45. B.M.; Camb.U.; Dub.T.C.i.; Oxon.B.
A. Sc. Nt...... Annales des Sciences Naturelles, comprenant la Physiologie animale et végétale, l'Anatomie comparée des deux règnes, la Zoologie, la Botanique, la Minéralogie et la Géologie. Paris.
 1824— B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Dub.T.C.; Geol.M.i.; Geol.S.i.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.i.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
As. Fr. C. R...... Association Française pour l'Avancement des Sciences. Compte Rendu. Paris, etc.
 1872— B.M.; Camb.U.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.; M.O.i.; N.H.M.; P.O.; R.A.S.i.; R.C.Surg.i.; R.S.; S.K.
Ashmole S. P...... Abstracts of the Proceedings of the Ashmolean Society. Oxford.
 1844—81. Camb.U.; Dub.R.D.S.; Edinb.R.S.i.; Geol.S.i.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.i.; R.S.; S.K.i.
Ashmole S. T...... Transactions of the Ashmolean Society. Oxford.
 1834—76. Camb.U.; Dub.R.D.S.; Edinb.R.S.; N.H.M.i.; Oxon.B.i.; Oxon.R.; P.O.i.; R.S.i.; S.K.i.
As. J...... The Astronomical Journal. Boston.
 1851—61; 1888— B.M.; Camb.U.; Glasg.U.i.; Oxon.B.; Oxon.R.i.; R.A.S.; R.S.i.; S.K.
See Gould As. J.
As. Nr...... Astronomische Nachrichten; Schumacher. Altona.
 1823— B.M.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.; Edinb.U.i.; Glasg.U.i.; I.CE.i.; Oxon.B.(R.); R.A.S.; R.S.; S.K.i.; U.C.L.i.
Asps. J...... The Astrophysical Journal. Chicago.
 1895— [Continuation of: Astronomy and Astrophysics, 1892—94.]
 B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.R.D.S.; Glasg.U.; Oxon.R.i.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.
As. Researches..... Asiatic Researches; or Transactions of the Society, instituted in Bengal, for inquiring into the History and Antiquities, Arts, Sciences, and Literature of Asia. Calcutta.
 1788—1836. B.M.; Camb.U.; Edinb.R.S.i.; Edinb.U.; Geol.S;

List of Serial Publications

- Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.;
R.A.S.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- As. S. Mm.** Memoirs of the [Royal] Astronomical Society of London. London.
1822— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.i.;
Glasg.U.; I.CE.; Oxon.B.; Oxon.R.; P.O.i.; R.A.S.; R.Geogr.
S.i.; R.S.; S.K.i.; U.C.L.
- As. S. M. Not.**..... Monthly Notices of the [Royal] Astronomical Society of London.
London.
1827— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
Edinb.R.S.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.;
Oxon.B.i.; Oxon.R.i.; P.O.i.; R.A.S.; R.Geogr.S.i.; R.S.;
S.K.i.; U.C.L.
- As. S. Pac. Pb.**..... Publications of the Astronomical Society of the Pacific. San
Francisco.
1889— B.M.; Camb.U.i.; Dub.R.D.S.i.; Glasg.U.i.; R.A.S.; R.S.i.
- Assur. Mg.** The Assurance Magazine and Journal of the Institute of Actuaries.
London.
1830—67. [*Continued as:* Journal of the Institute of Actuaries,
1869—] B.M.; Camb.U.i.; Edinb.R.S.i.; Geol.S.i.; R.A.S.i.;
R.S.i.; U.C.L.i.
- A. Tél.** Annales Télégraphiques, publiées sous le patronage du Directeur
Général des Lignes Télégraphiques. Paris.
1855— B.M.i.; Camb.U.i.; I.CE.i.; P.O.
- Aten. It.** L'Ateneo Italiano. Parigi.
1853—54. B.M.; Glasg.P.S.i.; R.S.; U.C.L.
- Athènes Obs. Nat. A.** ... Annales de l'Observatoire National d'Athènes. Athènes.
1896— Edinb.R.S.; M.O.; R.A.S.; R.S.
- At. Sc. It.** Riunione degli Scienziati Italiani. Atti. Pisa, etc. ...
1839—75. B.M.; Camb.U.; N.H.M.; R.S.
- At. S. Elvet.**..... Atti della Società Elvetica delle Scienze Naturali. Lugano.
1833, 1860. N.H.M.; S.K.
See Act. S. Helv., Sch. Gs. Vh., and Sch. Nf. Gs. Vh.
- Aube Mm. S. Ac.** {Mémoires de la Société [Académique] d'Agriculture, des Sciences,
Aube Mm. S. Ag. {et des Lettres du département de l'Aube. Troyes.
1823— B.M.; Camb.U.i.; Dub.T.C.i.; Oxon.B.; R.S.i.
- Augsb. Nt. Vr. B.** Bericht des Naturhistorischen [Naturwissenschaftlichen] Vereins in
Augsburg. Augsburg.
1848— Dub.R.I.A.i.; Glasg.P.S.i.; N.H.M.; R.S.i.
- Ausl.** Das Ausland. München, Stuttgart.
1828—93. B.M.; Camb.U.i.; N.H.M.i.; Oxon.B.i.; R.Geogr.S.i.
- Aust. As. Rp.** Report of the.....Meeting of the Australasian Association for the
Advancement of Science. Sydney.
1888— Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.; Dub.R.I.A.;
Edinb.R.S.; Edinb.U.i.; Geol.M.; Geol.S.; Glasg.U.i.; I.CE.i.;
Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.;
R.Geogr.S.; R.S.; S.K.
- Auvergne A. Sc.**..... Annales Scientifiques, Littéraires, et Industrielles de l'Auvergne,
publiées par l'Académie des Sciences, Belles-Lettres, et Arts de
Clermont-Ferrand. Clermont-Ferrand.
1828—58. [*Continued as:* Mémoires de l'Académie, etc., 1859—]
B.M.; Camb.U.; Oxon.B.; R.S.
- Bamb. Nf. Gs. B.**..... Bericht des Naturforschenden Gesellschaft zu Bamberg. Bamberg.
1852— N.H.M.
- Barcel. Ac. Bl.**..... Boletín de la Real Academia de Ciencias y Artes de Barcelona.
Barcelona.
1840—42; 1892— N.H.M.
- Barcel. Ac. Mm.**..... Memorias de la Real Academia de Ciencias Naturales y Artes de
Barcelona. Barcelona.
1876— N.H.M.
- B. A. Rp.** Report of the.....Meeting of the British Association for the
Advancement of Science. London.
1831— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.;
Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.;
Glasg.P.S.; Glasg.U.; I.CE.; Linn.S.; M.O.; N.H.M.; Oxon.B.i.;
Oxon.R.; Pharm.S.i.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.;
R.S.; S.K.; U.C.L.

List of Serial Publications

- Barrow F.C. Rp.** Barrow Naturalists' Field Club and Literary and Scientific Association. Annual Report and Proceedings. Barrow.
1877— B.M.; Camb.U.; Geol.S.i.; N.H.M.; Oxon.B.i.
- Basel B.** Bericht über die Verhandlungen der Naturforschenden Gesellschaft in Basel. Basel.
1835—52. B.M.; Camb.P.S.; Dub.T.C.; Geol.S.i.; Linn.S.; N.H.M.; R.S.
- Basel Vh.** Verhandlungen der Naturforschenden Gesellschaft in Basel. Basel.
1857— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Geol.S.; Linn.S.; N.H.M.; Oxon.R.; R.A.S.i.; R.S.; S.K.; U.C.L.i.
- Batav. Gn. Vh.** Verhandelingen van het Bataviaasch Genootschap der Kunsten en Wetenschappen. Batavia.
1778— B.M.; Camb.U.; Edinb.R.S.i.; Edinb.U.i.; Glasg.P.S.i.; Linn.S.i.; N.H.M.i.; Oxon.B.; R.Geogr. S.i.; R.S.
- Batav. Ntk. Ts.** Natuurkundig Tijdschrift voor Nederlandsch-Indië. Batavia.
1850— Camb.P.S.; Camb.U.; Edinb.R.S.i.; Linn.S.; N.H.M.; R.A.S.i.; R.S.i.; S.K.i.; U.C.L.i.
- Bath S. J.** Journal of the Bath and West of England Society for the Encouragement of Agriculture, Arts, Manufactures and Commerce. Bath.
1853— B.M.; Camb.U.; Dub.T.C.; Geol.M.; Oxon.B.; P.O.; S.K.
- Baumgartner Z.** Zeitschrift für Physik, Mathematik, und verwandte Wissenschaften; Baumgartner und von Ettingshausen. Wien.
1826—42. B.M.; Camb.U.i.; Oxon.B.i.(R.); R.S.i.; U.C.L.i.
- Bayeux Mm.** Mémoires de la Société d'Agriculture, Sciences, Arts et Belles-Lettres de Bayeux. Bayeux.
1842— B.M.; Oxon.B.; R.S.i.
- Bb. Brit.** Bibliothèque Britannique, ou Recueil extrait des Ouvrages Anglais périodiques et autres: partie des Sciences et Arts. Genève.
1796—1815. B.M.; Edinb.U.; N.H.M.; Oxon.B.; P.O.; R.S.
- Bb. It.** Biblioteca Italiana, ossia Giornale di Letteratura, Scienze, etc. Milano.
1816—56. B.M.; Edinb.R.S.i.; Oxon.B.
- Bb. Mth.** Bibliotheca Mathematica. Stockholm, Leipzig.
1857— B.M.; Camb.U.; Glasg.U.; Oxon.B.; Oxon.R.; R.S.; S.K.i.; U.C.L.
- Bb. Un.** Bibliothèque Universelle des Sciences, Belles-Lettres, et Arts, faisant suite à la Bibliothèque Britannique rédigée à Genève. Partie des Sciences. Genève.
1816—45. [Continued as: Archives des Sciences Physiques et Naturelles, 1846—] B.M.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.i.; Edinb.U.; Glasg.U.; N.H.M.; Oxon.B.; P.O.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.
- Bb. Un. Arch.** Bibliothèque Universelle. Archives des Sciences Physiques et Naturelles. Genève.
1846— [Continuation of: Bibliothèque Universelle des Sciences, etc., 1816—45.] B.M.; Camb.U.; Chem.S.i.; Dub.N.L.I.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.; Edinb.U.; Glasg.U.; I.CE.i.; M.O.i.; N.H.M.; Oxon.B.; P.O.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.
- Belfast NH. S. P.** See **Arch. Sc. Ps. Nt.**
- Belfast NH. S. Rp. & P.** Report and Proceedings of the Belfast Natural History and Philosophical Society. Belfast.
1852— B.M.i.; Camb.P.S.; Dub.N.L.I.; Dub.R.D.S.; Dub.T.C.; Edinb.R.S.i.; Geol.S.i.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; P.O.i.; R.A.S.
- Beng. As. S. J.** Journal of the Asiatic Society of Bengal. Calcutta.
1832— B.M.; Camb.P.S.i.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.i.; Geol.S.; Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.i.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Beng. As. S. P.** See **Beng. J. As. S.**
- Beng. J. As. S.** Proceedings of the Asiatic Society of Bengal. Calcutta.
1865— B.M.; Camb.P.S.i.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; Edinb.U.i.; Geol.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.
- Berg-Hm. Jb.** See **Berg. As. S. J.**
- Berg-Hm. Jb.** Berg- und Hüttenmännisches Jahrbuch der k.k. Schemnitzer-

List of Serial Publications

- Bergakademie und der k.k. Montan-Lehranstalten zu Leoben
und Pöbram. Wien.
- 1851— B.M.i.; Geol.S.i.; I.CE.i.; P.O.i.; S.K.
See **Jb. Berg-Hm., Leoben Berg-Hm. Jb. and Wien Berg-Hm. Jb.**
- Berg-Hm. Ztg.** Berg- und Hüttenmännische Zeitung; mit besonderer Berücksichtigung der Mineralogie und Geologie; Hartmann. Nordhausen, Leipzig.
- 1842— B.M.; I.CE.i.; N.H.M.; P.O.; S.K.
- Berl. Ab.** Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin. Berlin.
- Berl. Ak. Ab.** 1804— B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Edinb.R.S.; Edinb.U.; Geol.M.i.; Geol.S.i.; Glasg.U.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.A.S.i.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- Berl. Ak. Mb.** Monatsberichte der K. Preuss. Akademie der Wissenschaften zu Berlin. Berlin.
- 1856—81. [*Continuation of: Berichte, etc., 1836—55.*] [*Continued as: Sitzungsberichte, etc., 1882—*] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; Math.S.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- See **Berl. Mb.**
- Berl. Ak. Sb.** Sitzungsberichte der K. Preussischen Akademie der Wissenschaften zu Berlin. Berlin.
- 1882— [*Continuation of: Monatsberichte, etc., 1856—81.*] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.i.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.i.; Linn.S.; Math.S.; N.H.M.i.; Oxon.B.; Oxon.R.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Berl. A. Tel.** Annalen der Telegraphie. Berlin.
1872. Glasg.P.S.i.; P.O.
- Berl. B.** Bericht über die zur Bekanntmachung geeigneten Verhandlungen der K. Preuss. Akademie der Wissenschaften zu Berlin. Berlin.
- 1836—55. [*Continued as: Monatsberichte, etc., 1856—81.*] B.M.; Dub.R.I.A.i.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.B.; P.O.; R.A.S.i.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.
- Berl. B.** Berichte der Deutschen Chemischen Gesellschaft. Berlin.
- 1868— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.; Glasg.P.S.; Glasg.U.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
- See **D. C. Gs. B.**
- Berl. Gs. Erdk. Vh.** Verhandlungen der Gesellschaft für Erdkunde zu Berlin. Berlin.
- 1873— B.M.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.; Glasg.P.S.i.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.; S.K.
- Berl. Gs. Nt. Fr. Mg.** Arbeiten aus dem Kaiserlichen Gesundheitsamte. Berlin.
- 1886— [*Continuation of: Mittheilungen, 1881—84.*] Camb.U.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; Oxon.R.; P.O.; R.C.Surg.; R.S.
- Berl. Gs. Nt. Fr. N. Schr.** Magazin der Gesellschaft Naturforschender Freunde zu Berlin, für die neuesten Entdeckungen in der gesammten Naturkunde. Berlin.
- 1807—18. B.M.; Camb.U.; Edinb.R.S.; Edinb.U.i.; Glasg.P.S.i.; Oxon.R.; R.C.Surg.; R.S.
- Berl. Mb.** See **Berl. Ak. Mb.**
- Berl. Min.** Mémoires de l'Académie Royale des Sciences de Berlin. Berlin.
- Berl. Min. Ac.** 1770—1804. B.M.i.; Camb.U.; Dub.R.D.S.i.; Dub.T.C.i.; Edinb.R.S.; Edinb.U.; Glasg.U.i.; N.H.M.; Oxon.B.; P.O.; R.S.; S.K.; U.C.L.

List of Serial Publications

- Berl. Mt. Gs. Nf.** Mittheilungen aus den Verhandlungen der Gesellschaft Naturforschender Freunde zu Berlin. Berlin.
1836—39. B.M.; Glasg.P.S.i.; N.H.M.; Oxon.R.; R.S.
- Berl. Nf. Fr. Sb.** Sitzungs-Berichte der Gesellschaft Naturforschender Freunde zu Berlin. Berlin.
1860—. B.M.; Camb.P.S.i.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.i.; N.H.M.; Oxon.R.; R.S.i.; S.K.i.
- Berl. Pol. Gs. Vh.** Verhandlungen der Polytechnischen Gesellschaft. Berlin.
1851— [Continuation of: Berichte, etc., 1839—51.] R.S.i.
- Berl. Pol. Gs. Vort.** Vorträge in der Polytechnischen Gesellschaft zu Berlin. Berlin.
1854—55. Glasg.P.S.i.; R.S.
- Berl. Ps. Gs. Vh.** Verhandlungen der Physikalischen Gesellschaft in Berlin. Berlin.
1882—98. [Continued as: Verhandlungen der Deutschen Physikalischen Gesellschaft, 1899—] Camb.P.S.i.; Camb.U.; Glasg.U.; N.H.M.; Oxon.B.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.i.
- Berl. Ps. Reichsanst. Ab.** Wissenschaftliche Abhandlungen der Physikalisch-Technischen Reichsanstalt. Berlin.
1894— Camb.P.S.; Camb.U.i.; Chem.S.; Edinb.R.S.; Glasg.U.i.; P.O.; S.K.; U.C.L.
- Berl. Strnw. Beob.-Ergebn.** Beobachtungs-Ergebnisse der Königlichen Sternwarte zu Berlin. Berlin.
1881— R.A.S.; R.S.
- Berl. Tel. Vr. Z.** Zeitschrift des Deutsch-Oesterreichischen Telegraphen-Vereins. Herausg. in dessen Auftrage von der K. Preuss. Telegraphen-Direction. Berlin.
1854—69. I.CE.; P.O.
See **Berl. Z. Tel. and Tel. Vr. Z.**
- Berl. Vh. Md. Gs.** Verhandlungen der Berliner Medicinischen Gesellschaft. Berlin.
1865— R.C.Surg.i.
- Berl. Z. Tel.** See **Berl. Tel. Vr. Z. and Tel. Vr. Z.**
- Bern Mt.** Mittheilungen der Naturforschenden Gesellschaft in Bern. Bern.
1843— B.M.; Camb.P.S.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; N.H.M.; R.S.; S.K.
- Béziers S. Sc. Bil.** Bulletin de la Société d'Étude des Sciences Naturelles de Béziers. Béziers.
1876— N.H.M.; R.S.i.
- Birm. Ph. S. P.** Proceedings of the Birmingham Philosophical Society. Birmingham.
1876— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Edinb.U.i.; Geol.M.; Glasg.P.S.; Glasg.U.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.i.; R.Geogr.S.i.; R.S.; U.C.L.i.
- Bl. Cb.** Biologisches Centralblatt. Erlangen, Leipzig.
1881— B.M.; Camb.U.; Edinb.R.S.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
- Bil. As.** Bulletin Astronomique publié sous les Auspices de l'Observatoire de Paris. Paris.
1884— B.M.; Camb.U.; Edinb.R.S.; Oxon.R.; R.A.S.; S.K.
- Bil. Phm.** Bulletin de Pharmacie; Parmentier, etc. Paris.
1809—14. [Continued as: Journal de Pharmacie, 1815—41.] B.M.; Camb.U.; Chem.S.; Oxon.B.; Pharm.S.; P.O.; R.C.Surg.; R.S.
- Bil. Sc. Fr. Big.** Bulletin Scientifique de la France et de la Belgique. London, Paris, Berlin.
1888— [Continuation of: Bulletin Scientifique...du Nord et des pays voisins, 1869—87.] Camb.U.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.R.
- Bil. Sc. Mth.** Bulletin des Sciences Mathématiques. Paris.
1885— [Continuation of: Bulletin des Sciences Mathématiques et Astronomiques, 1870—84.] Camb.U.; Dub.T.C.; Edinb.R.S.; Glasg.U.; Math.S.; Oxon.B.; Oxon.R.; R.A.S.; R.S.; S.K.; U.C.L.
- Bil. Sc. Mth. As.** Bulletin des Sciences Mathématiques et Astronomiques. Paris.
1870—84. [Continued as: Bulletin des Sciences Mathématiques, 1885—] B.M.; Camb.U.; Edinb.R.S.; Glasg.U.; Math.S.; Oxon.R.; R.A.S.i.; R.S.; S.K.; U.C.L.i.
- Bil. Sc. Nord.** Bulletin Scientifique, Historique et Littéraire du Département du Nord et des pays voisins. Lille.

List of Serial Publications

- 1869—87. [*Continued as:* Bulletin scientifique de la France et de la Belgique, 1888—] Camb.U.; Linn.S.; N.H.M.
Bil. V. It. Bullettino del Vulcanismo Italiano. Roma.
 1874—97. Camb.U.; Geol.M.; Glasg.P.S.i.
Bode As. Jb. { Astronomisches Jahrbuch, nebst einer Sammlung der neuesten in
Bode Jb. { die astronomischen Wissenschaften einschlagenden Abhand-
 1776—1829. Dub.T.C.i.; Glasg.U.; R.A.S.; R.S.i.
 lungen, Beobachtungen, und Nachrichten; Bode. Berlin.
Böhm. Gs. Ab. { Abhandlungen der K. Böhmischen Gesellschaft der Wissenschaften.
 Prag.
 1785—1892. B.M.i.; Camb.P.S.; Camb.U.i.; Dub.R.I.A.i.; Edinb.
 R.S.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.i.;
 R.S.i.; S.K.i.
See **Prag Ab.**
Böhm. Gs. Ws. Jbr. Jahresbericht der Königl. Böhm. Gesellschaft der Wissenschaften.
 Prag.
 1876— B.M.i.; Camb.P.S.; Edinb.R.S.i.; Linn.S.i.; N.H.M.;
 R.S.
Bologna Ac. Mm. { Memorie della Accademia delle Scienze dell' Istituto di Bologna.
 Bologna.
Bologna Ac. Sc. Mm. { 1850— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; N.H.M.;
 Oxon.B.; R.A.S.; R.S.; S.K.i.; U.C.L.i.
Bologna Mm. Ac. { Memorie dell' Istituto Nazionale Italiano: Classe di Fisica e di
 Matematica. Bologna.
Bologna Mm. Ac. Sc. { 1806—13. B.M.; Camb.U.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.i.;
 N.H.M.; Oxon.B.i.; R.C.Surg.; R.S.i.
Bologna Mm. I. It. { Memorie della Società Medica di Bologna. Bologna.
 1807. Glasg.P.S.i.
Bologna Mm. S. Md. { Nuovi Annali delle Scienze naturali; Alessandrini, Bertolini,
 Gherardi, e Ranzani. Bologna.
 1838—54. Camb.U.; Geol.S.i.; N.H.M.; Oxon.B.i.; R.Geogr.S.i.;
 R.S.
See **N. A. Sc. Nt.**
Bologna N. Cm. { Novi Commentarii Academicæ Scientiarum Instituti Bononiensis.
 Bononiæ.
 1834—49. Camb.U.; Edinb.R.S.; N.H.M.; Oxon.B.; R.S.
Bologna Opusc. Sc. { Opuscoli Scientifici. Bologna.
 1817—23. B.M.; Camb.U.; Edinb.R.S.i.; N.H.M.; R.C.Surg.i.;
 S.K.
Bologna Opusc. Sc. N. Nuova collezione d' Opuscoli Scientifici. Bologna.
 Col.
 1824—25. Camb.U.
Bologna Rd. { Rendiconto delle Sessioni dell' Accademia delle Scienze dell' Istituto
 di Bologna. Bologna.
 1851— B.M.; Camb.U.i.; Dub.T.C.; Edinb.R.S.i.; Glasg.U.i.;
 N.H.M.i.; Oxon.B.i.; R.A.S.i.; R.S.i.; U.C.L.i.
Bône Ac. Hip. Bil. { Bulletin de l'Académie d'Hippone. Bône.
 1865— Camb.U.; N.H.M.i.
Bonn Cor.-Bl. NH. Vr. { Correspondenzblatt des Naturhistorischen Vereins für Rheinland
 und Westphalen. Bonn.
Bonn NH. Vr. Cor.-Bl. { 1844— Dub.R.D.S.; Dub.R.I.A.i.; Glasg.P.S.i.; Linn.S.; N.H.M.
 Verhandlungen des Naturhistorischen Vereins der Preussischen
 Rheinlande, Westfalens und des Reg.-Bezirks Osnabrück. Bonn.
Bonn NH. Vr. Vh. { 1844— B.M.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.
 R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; Oxon.R.; R.C.Surg.i.;
 R.S.i.; S.K.
See **Bonn Vh. NH. Vr. and Rheinl. Westphal. Vh.**
Bonn Niedr. Gs. Sb. { Sitzungsberichte der Niederrheinischen Gesellschaft für Natur- und
 Heilkunde zu Bonn. Bonn.
Bonn Sb. Niedr. Gs. { 1854— B.M.i.; Camb.U.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.
 R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; Oxon.R.; R.S.i.; S.K.
See **Rheinl. Westphal. Sb.**
Bonn Vh. NH. Vr. *See* **Bonn. NH. Vr. Vh. and Rheinl. Westphal. Vh.**
Bordeaux Ac. Act. { Recueil des Actes de l'Académie des Sciences, Belles-Lettres, et Arts
 de Bordeaux. Bordeaux.
 1839— B.M.i.; Dub.R.I.A.i.; Dub.T.C.i.; N.H.M.i.; Oxon.B.i.;
 R.S.i.
See **Bordeaux Act.**

List of Serial Publications

- Bordeaux Ac. Sc. Sé. Pbl.** { Séances publiques de l'Académie Royale des Sciences, Belles-Lettres,
Bordeaux Ac. Sé. Pbl. { et Arts de Bordeaux. Bordeaux.
 1819—37. N.H.M.
- Bordeaux Act.** { See **Bordeaux Ac. Act.**
- Bordeaux Act. Ac. Sc.** {
- Bordeaux J. Md.** { Journal de Médecine de Bordeaux. Bordeaux.
 1843?—61. R.C.Surg.i.
- Bordeaux Mm. S. Sc.** { Mémoires de la Société des Sciences Physiques et Naturelles de
Bordeaux Mm. S. Sc. Ps. { Bordeaux. Bordeaux.
 1855— Camb.P.S.; Dub.R.D.S.; Dub.T.C.; Edinb.R.S.; Geol.S.;
 Glasg.P.S.; Linn.S.; Math.S.; N.H.M.; Oxon.B.; R.A.S.; R.S.;
 S.K.
 See **Bordeaux S. Sc. Mm.**
- Bordeaux Obs. A.** { Annales de l'Observatoire de Bordeaux. Paris, Bordeaux.
 1885— Dub.R.D.S.; R.A.S.; R.S.
- Bordeaux S. L. Act.** { Actes de la Société Linnéenne de Bordeaux. Bordeaux.
 1830— [Continuation of: Bulletin d'Histoire Naturelle de la
 Société, etc., 1826—29.] B.M.; Camb.U.; Dub.R.D.S.i.; Dub.
 R.I.A.i.; Geol.S.i.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; R.S.i.;
 U.C.L.i.
- Bordeaux S. Md. Mm.** { Mémoires et Bulletins de la Société Medico-Chirurgicale des Hôpitaux
 et Hospices de Bordeaux. Paris, Bordeaux.
 1866—71.
 Mémoires et Bulletins de la Société de Médecine et de Chirurgie de
 Bordeaux. Paris, Bordeaux.
 1872— Dub.R.D.S.; R.S.
- Bordeaux S. Sc. Mm.** { See **Bordeaux Mm. S. Sc.**
- Bordeaux S. Sc. PV.** { Procès-Verbaux des Séances de la Société des Sciences Physiques
 et Naturelles de Bordeaux. Paris, Bordeaux.
 1894— Camb.P.S.; Dub.R.D.S.i.; Edinb.R.S.; Math.S.; N.H.M.;
 R.A.S.; R.S.
- Bost. Am. Ac. Mm.** { Memoirs of the American Academy of Arts and Sciences. Cambridge,
Bost. Mm. Am. Ac. { Boston.
 1785— B.M.i.; Camb.P.S.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.;
 Dub.T.C.i.; Edinb.R.S.; Geol.S.i.; I.CE.i.; Linn.S.; N.H.M.;
 Oxon.R.; P.O.i.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- See **Am. Ac. Mm.**
- Bost. S. Md. Sc. J.** { Journal of the Boston Society of Medical Sciences. Boston.
 1897— Glasg.P.S.i.; R.C.Surg.
- Bost. S. NH. P.** { Proceedings of the Boston Society of Natural History. Boston.
 1841— B.M.; Camb.P.S.i.; Camb.U.; Dub.R.I.A.; Edinb.R.S.;
 Edinb.U.i.; Geol.S.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; Oxon.R.;
 R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Brain** { Brain: a Journal of Neurology. London, New York.
 1878— B.M.; Camb.U.; Glasg.P.S.i.; Oxon.B.; Oxon.R.;
 R.C.Surg.; U.C.L.
- Br. Archt. I. Pp.** { Papers read at the Royal Institute of British Architects. London.
 1854—78. B.M.; Camb.U.i.; Edinb.R.S.i.; P.O.; S.K.; U.C.L.i.
- See **Br. Archt. Pp.**
- Br. Archt. I. T.** { Transactions of the Institute of British Architects of London.
 1836—42; 1879—92. B.M.i.; Camb.U.; Dub.T.C.; Edinb.R.S.i.;
 Edinb.U.i.; I.CE.i.; Oxon.B.; P.O.; R.S.; U.C.L.i.
- See **Br. Archt. T.**
- Br. Archt. J.** { Journal of the Royal Institute of British Architects. London.
 1885— Camb.U.i.; Edinb.U.i.; Glasg.U.i.; I.CE.; Oxon.B.; P.O.;
 U.C.L.
- Br. Archt. Pp.** { See **Br. Archt. I. Pp.**
- Br. Archt. Pp. (& T.)** { See **Br. Archt. I. T.**
- Br. Archt. T.** {
- Braunsch. Vr. Nt. Jbr.** { Jahresbericht des Vereins für Naturwissenschaft zu Braunschweig.
 Braunschweig, Altenburg.
 1879— Dub.R.I.A.i.; Edinb.R.S.; Linn.S.; N.H.M.; R.S.
- Brem. Ab.** { Abhandlungen herausgegeben vom Naturwissenschaftlichen Vereine
 zu Bremen.
 1868— B.M.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.;
 Linn.S.; N.H.M.; R.S.; S.K.

List of Serial Publications

- Brescia At. Cm.** { Commentarij della Accademia di Scienze, Lettere, Agricoltura ed
Brescia Cm. { Arti del Dipartimento del Mella. Brescia.
Brescia Cm. Aten. { 1808—11.
 { Commentarij dell' Ateneo di Brescia. Brescia.
 { 1812— B.M.; Camb.U.i.; N.H.M.i.; Oxon.B.i.; R.S.i.
Bresl. Jbr. Schl. Gs. { Jahresbericht der Schlesischen Gesellschaft für vaterländische
Bresl. Schl. Gs. Jbr. { Cultur. Breslau.
 { 1850— [Continuation of: Uebersicht der Arbeiten, etc., 1824—49.]
 { Dub.R.D.S.i.; Dub.R.I.A.i.; Geol.S.i.; N.H.M.; R.C.Surg.i.;
 { R.S.; S.K.
Bresl. Schl. Gs. Übs. { Uebersicht der Arbeiten und Veränderungen der Schlesischen
 { Gesellschaft für vaterländische Cultur. Breslau.
 { 1824—49. [Continued as: Jahresbericht, etc., 1850—] B.M.; Geol.
 { S.i.; N.H.M.; R.S.; S.K.
Brest S. Ac. Bll. { Bulletin de la Société Académique de Brest. Brest.
 { 1858— B.M.; Camb.U.i.; S.K.i.
Brighton NH. S. Rp. { Brighton and Sussex Natural History and Philosophical Society.
 { Annual Report. Brighton.
 { 1855— Geol.S.i.; Glasg.P.S.i.; N.H.M.; R.S.i.
Bristol Nt. S. P. { Proceedings of the Bristol Naturalists' Society. Bristol.
 { 1866— B.M.i.; Camb.U.i.; Geol.M.; Geol.S.i.; Linn.S.; N.H.M.;
 { R.C.Surg.i.; R.S.i.; U.C.L.i.
Br. Met. S. P. { Proceedings of the [British] Meteorological Society. London.
 { 1861—71. [Continued as: Quarterly Journal of the [Royal] Meteorological
 { Society, 1872—] Camb.U.; Dub.R.D.S.; Edinb.R.S.;
 { Glasg.P.S.i.; M.O.; Oxon.B.; R.A.S.; R.S.; S.K.
Brosche Z. { Zeitschrift für Natur- und Heilkunde; Brosche, Carus, Choulant, etc.
 { Dresden.
 { 1820—30. Edinb.U.i.; Glasg.P.S.i.; R.C.Surg.; R.S.; U.C.L.i.
Brown-Séguard J. Pl. ... { Journal de la Physiologie de l'Homme et des Animaux; Brown-
 { Séguard. Paris.
 { 1858—65. [Continued as: Archives de Physiologie, etc., 1868—98.]
 { B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.; Oxon.B.;
 { Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
Br. Phm. Conf. P. { Proceedings of the British Pharmaceutical Conference. London.
 { 1864—69. [Continued as: Transactions, etc., 1870—] B.M.;
 { Camb.U.i.; Chem.S.; Glasg.P.S.i.; Oxon.B.; Pharm.S.; R.S.
Brugnatelli G. { Giornale di Fisica, Chimica, e Storia Naturale; Brugnatelli, etc.
 { Pavia.
 { 1808—27. B.M.; Camb.U.; Dub.T.C.; N.H.M.i.; Oxon.B.; P.O.;
 { R.C.Surg.; R.S.
Brünn Jh. Nw. Sect. { Jahressheft der Naturwissenschaftlichen Section der K. K. Mährisch-
 { Schlesischen Gesellschaft für Ackerbau, Natur- und Landes-
 { Kunde. Brünn.
 { 1858. S.K.
Brünn Mt. { Mittheilungen der kaiserlich-königlichen Mährisch-Schlesischen
 { Gesellschaft zur Beförderung des Ackerbaues, der Natur- und
 { Landeskunde in Brünn. Brünn.
 { 1821—91. B.M.; R.S.i.; S.K.i.
Brünn Notb. { Notizen-Blatt der Historisch-statistischen Section der K. K. Mährisch-
 { Schlesischen Gesellschaft zur Beförderung des Ackerbaues, der
 { Natur- und Landeskunde in Brünn. Brünn.
 { 1855— B.M.; Glasg.P.S.i.; S.K.
Brünnow As. Not. { Astronomical Notices; Brünnow. Ann Arbor, Mich.
 { 1858—62. R.A.S.; R.S.i.
Brünn Vh. { Verhandlungen des Naturforschenden Vereins zu Brünn. Brünn.
 { 1863— Camb.U.i.; Dub.R.I.A.; Linn.S.; N.H.M.; R.S.
Brux. Ac. Bll. { Bulletins de l'Académie Royale des Sciences, etc., de Belgique.
 { Bruxelles.
 { 1834— B.M.i.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
 { Edinb.R.S.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.;
 { Math.S.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.; R.C.Surg.;
 { R.Geogr.S.i.; R.S.; S.K.i.
 { See **Brux. Bll. Ac.**
Brux. Ac. Cent. Anniv. { Centième Anniversaire de Fondation (1772—1872) de l'Académie
 { Royale de Belgique. Bruxelles.
 { 1872. B.M.; Camb.U.; Chem.S.; Dub.R.I.A.; Edinb.R.S.; Geol.S.;

List of Serial Publications

- Glasg.P.S.; Glasg.U.; I.CE.; Linn.S.; N.H.M.; P.O.; R.A.S.;
R.Geogr.S.; R.S.; S.K.
- Brux. Ac. Md. Bil.**..... Bulletin de l'Académie Royale de Médecine de Belgique à Bruxelles.
Bruxelles.
1841— B.M.; Camb.U.; Dub.R.D.S.; Dub.T.C.i.; Glasg.P.S.i.;
Oxon.B.(R.); R.C.Surg.i.; R.S.
- Brux. Ac. Md.**..... Mémoires de l'Académie Royale de Médecine de Belgique: Mémoires
(*Mm. Sav. Étr.*)... des Concours et des Savants Étrangers. Bruxelles.
1847— B.M.; Camb.U.; Glasg.P.S.i.; Oxon.B.(R.); R.C.Surg.; R.S.
- Brux. Ac. Mm.**..... Mémoires de l'Académie Royale des Sciences, des Lettres et des
Brux. Ac. Sc. Mm...... Beaux-Arts de Belgique. Bruxelles.
1820— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.;
Edinb.R.S.i.; Edinb.U.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.;
Oxon.B.(R.); P.O.i.; R.A.S.i.; R.C.Surg.; R.Geogr.S.i.; R.S.;
S.K.i.
- See **Brux. Mm. Ac. Sc.**
Annales des Travaux Publiques de Belgique. Bruxelles.
1843— B.M.; I.CE.i.; P.O.; S.K.i.
- Brux. A. Un.**..... Annales des Universités de Belgique. Bruxelles.
1842—63. Camb.U.; Oxon.B.; P.O.; R.S.i.
- Brux. Bil. Ac.**..... See **Brux. Ac. Bil.**
Brux. Bil. Pht...... Bulletin Belge de la Photographie. Bruxelles.
1862—81. B.M.; Glasg.P.S.i.; P.O.
- Brux. J. S. Ag.**..... Journal de la Société Centrale d'Agriculture de Belgique. Bruxelles.
1854— B.M.; Glasg.P.S.i.; P.O.
- Brux. Mm. Ac. Sc.**..... See **Brux. Ac. Mm.**
Brux. Mm. Cour...... Mémoires Couronnés et Mémoires des Savants Etrangers, publ. par
Brux. Mm. Cour. 4°..... l'Acad. Roy. des Sciences, etc. de Belgique. 4to. Bruxelles.
1818— B.M.i.; Camb.P.S.; Camb.U.; Dub.T.C.; Edinb.R.S.i.;
Edinb.U.; Geol.S.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.;
Oxon.B.(R.); P.O.i.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.i.
- Brux. Mm. Cour. 8°**..... Mémoires Couronnés et autres Mémoires, publ. par l'Acad. Roy. des
Sciences, etc. de Belgique. 8vo. Bruxelles.
1840— B.M.; Camb.P.S.; Camb.U.; Dub.T.C.; Edinb.R.S.;
Geol.S.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.; Oxon.B.;
P.O.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.
- Brux. S. Blg. As. Bil.** ... Bulletin de la Société Belge d'Astronomie. Comptes Rendus des
Séances mensuelles de la Société et Revue des Sciences d'Obser-
vation, Astronomie, Météorologie, Géodésie et Physique du Globe.
Bruxelles.
1896— R.A.S.
- Brux. S. Blg. Gl. Bil.**..... Bulletin de la Société Belge de Géologie, de Paléontologie et
d'Hydrologie. Bruxelles.
1887— B.M.; Geol.M.; Geol.S.; Glasg.P.S.i.; N.H.M.; R.S.; S.K.;
U.C.L.
- Brux. S. Blg. Mcr. A.** ... Annales de la Société Belge de Microscopie. Bruxelles.
1875— Camb.P.S.i.; Glasg.P.S.i.; N.H.M.; P.O.i.
- Brux. S. Blg. Mcr. Bil.**... Bulletin de la Société Belge de Microscopie. Bruxelles, Paris.
1875— Camb.P.S.i.; Glasg.P.S.i.; N.H.M.; P.O.i.
- Brux. S. Sc. A.**..... Annales de la Société Scientifique de Bruxelles. Bruxelles.
1877— B.M.; Dub.N.L.I.i.; Edinb.R.S.; I.CE.i.; N.H.M.
- Bt. Ch.**..... Botanisches Centralblatt. Cassel.
1880— B.M.; Camb.U.; Edinb.R.S.i.; Glasg.P.S.i.; Glasg.U.;
Linn.S.; N.H.M.; R.S.; S.K.; U.C.L.
- Bt. Gz.**..... The Botanical Gazette. Crawfordville.
1875— Glasg.P.S.i.; Glasg.U.i.; Linn.S.i.; N.H.M.; Pharm.S.i.;
S.K.i.; U.C.L.i.
- Bt. Not.**..... Botaniska Notiser. Lund.
1839— B.M.; Camb.U.; Glasg.P.S.i.; Linn.S.; N.H.M.
- Btr. An. Pl.**..... Beiträge zur Anatomie und Physiologie; Eckhard. Giessen.
1858—88. Camb.U.; Edinb.U.; N.H.M.; Oxon.B.; R.S.; U.C.L.i.
- Btr. Geops.**..... Beiträge zur Geophysik. Stuttgart, Leipzig.
1887— Camb.U.; Edinb.U.; Geol.M.; Geol.S.; M.O.; Oxon.B.;
R.Geogr.S.; R.S.; S.K.
- Bt. Ztg.**..... Botanische Zeitung. Berlin, Leipzig.
1843— B.M.; Camb.U.; Edinb.R.S.; Edinb.U.i.; Glasg.P.S.i.;
Glasg.U.; Linn.S.; N.H.M.; R.S.; S.K.; U.C.L.i.

List of Serial Publications

- Bucarest Ac. Rom. A.** ... *Analele Academiei Romane.* Bucuresci.
1880— B.M.; Camb.U.i.; M.O.i.; N.H.M.i.
- Bucarest S. Sc. Bl.** *Buletinul Societății de Științe Fizice (Fizica, Chimia și Mineralogia)*
din Bucuresci-România.
[1892]—[1896].
Buletinul Societății de Științe din Bucuresci-România. Bucuresci.
(*Bulletin de la Société des Sciences Bucarest-Roumanie.*)
[1897]— Glasg.P.S.; Glasg.U.; N.H.M.; R.S.i.; U.C.L.i.
- Buda Tudománytár** *Tudománytár Közre bocsátja a Magyar Tudós Társaság.* [Repertory
of Science.] Budán.
1833—48. B.M.; Glasg.P.S.i.; R.S.i.
- Cadiz Period. M. Ci.** *Periódico mensual de Ciencias matemáticas y físicas.* Cadiz.
1848. B.M.; R.S.
- Caen Ac. Mm.** *Mémoires de l'Académie des Sciences, Arts et Belles-Lettres de*
Caen Mm. Ac. *Caen.* Caen.
1811— B.M.i.; Camb.U.i.; Dub.T.C.i.; N.H.M.i.; Oxon.B.i.; R.S.i.;
S.K.i.
- Caen Mm. S. L.** *Mémoires de la Société Linnéenne du Calvados [de Normandie].* Caen.
1824— B.M.; Camb.U.; Edinb.U.i.; Geol.M.; Geol.S.i.; Linn.S.i.;
N.H.M.; R.S.i.; U.C.L.i.
- Caen S. L. Bl.** *Bulletin de la Société Linnéenne de Normandie.* Caen.
1855— B.M.; Camb.U.; Geol.S.i.; Glasg.P.S.i.; Linn.S.; N.H.M.;
R.S.i.; U.C.L.i.
- Caen Tr.** *See Norm. S. L. Bl.*
Précis des Travaux de la Société d'Agriculture, etc. de Caen. Caen.
1811—58. B.M.; Camb.U.i.
- Cæs. Leop. Ac. N. Acta.** *Nova Acta physico-medica Academiae Cæs. Leopoldino-Carolinæ*
Nature Curiosorum. Erlangen, Bonn, Breslau.
1758— Camb.P.S.; Camb.U.; Chem.S.i.; Dub.T.C.; Edinb.R.S.i.;
Edinb.U.; Geol.S.i.; Glasg.U.; Linn.S.i.; N.H.M.; Oxon.R.;
Pharm.S.i.; R.A.S.i.; R.C.Surg.; R.S.; S.K.i.; U.C.L.i.
- Calc. J. NH.** *See Ac. Cæs. Leop. N. Acta and Ac. Nt. C. N. Acta.*
The Calcutta Journal of Natural History. Calcutta.
1841—48. B.M.; Camb.U.; Dub.R.D.S.; Geol.S.i.; Linn.S.i.;
N.H.M.; Oxon.R.; P.O.; R.S.; S.K.
- Calc. QJ.** *Quarterly Journal of the Medico-Physical Society.* Calcutta.
1857. Edinb.U.i.; Glasg.P.S.i.
- Calif. Ac. P.** *Proceedings of the California Academy of Natural Sciences.* San
Francisco.
1854— B.M.i.; Camb.P.S.i.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.i.;
Glasg.P.S.; Linn.S.i.; N.H.M.; P.O.i.; R.Geogr.S.; R.S.i.;
S.K.i.
- Camb. and Dubl. Mth. J.** *The Cambridge and Dublin Mathematical Journal; Thomson and*
Ferrers. Cambridge.
1846—54. B.M.; Camb.P.S.i.; Camb.U.; Dub.T.C.i.; Edinb.R.S.;
Edinb.U.; Glasg.U.; N.H.M.; Oxon.B.; R.S.; U.C.L.
- Camb. (M.) Mth. M.** *The Mathematical Monthly; Runkle.* Cambridge (Massachusetts).
1859—61. B.M.; Camb.U.; Oxon.B.; P.O.; R.A.S.i.; R.S.; U.C.L.
- Camb. Mth. J.** *See Camb. (U.S.) Mth. M.*
The Cambridge Mathematical Journal. London.
1839—45. B.M.; Camb.P.S.; Camb.U.; Dub.T.C.; Edinb.U.;
Glasg.U.; Math.S.i.; Oxon.B.i.; R.S.; U.C.L.
- Camb. Ph. S. P.** *Proceedings of the Cambridge Philosophical Society.* Cambridge.
1866— B.M.i.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.;
Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.;
I.CE.; Linn.S.i.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.i.; Oxon.
R.i.; P.O.; R.A.S.i.; R.C.Surg.i.; R.S.; S.K.; U.C.L.
- Camb. Ph. S. T.** *Transactions of the Cambridge Philosophical Society.* Cambridge.
1822— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.T.C.i.;
Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.i.;
Linn.S.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.;
R.A.S.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Camb. (U.S.) Mth. M.** *See Camb. (M.) Mth. M.*
- Cantù Cronaca** *Cronaca: Giornale di Scienze, Lettere, Arti, Economia, Industria;*
Cantù. Milano.
1855—58. Glasg.P.S.i.; R.S.

List of Serial Publications

- Card. Nt. S. T.**..... Cardiff Naturalists' Society. Reports and Transactions. Cardiff.
1868— B.M.i.; Camb.U.i.; Dub.R.D.S.; Geol.M.i.; Geol.S.i.;
Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.B.i.; R.S.i.
- Carl Rpm.**..... Repertorium für physikalische Technik, für mathematische und
astronomische Instrumentenkunde; Carl. München.
1865—82. [*Continued as*: Repertorium der Physik; Exner, 1883—91.]
B.M.; Camb.U.i.; Dub.N.L.I.i.; I.CE.i.; M.O.; Oxon.R.; P.O.;
R.S.; S.K.
- Carlsruhe Vh. Nw. Vr.**... Verhandlungen des Naturwissenschaftlichen Vereins. Carlsruhe.
1864— B.M.i.; Dub.R.I.A.; Geol.S.i.; N.H.M.
See Karlsruhe Nt. Vr. Vh.
- Časopis**..... Časopis pro Pěstování Matematiky a Fysiky. Prag.
1872— B.M.
- Catania Ac. Gioen. At.**... Atti dell' Accademia Gioenia di Scienze Naturali in Catania. Catania.
1825— B.M.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.i.;
Linn.S.i.; Math.S.i.; N.H.M.; Oxon.B.; R.S.; S.K.i.
See Catania At. Ac. Gioen.
- Catania Ac. Gioen. Bil.**... Bullettino mensile della Accademia Gioenia di Scienze Naturali in
Catania. Catania.
1888— Dub.R.I.A.; Edinb.R.S.; Math.S.i.; N.H.M.; R.S.
See Catania Ac. Gioen. At.
- Catania At. Ac. Gioen.**... Biblioteca di Farmacia, Chimica, etc.; Cattaneo. Milan.
- Cattaneo Bb. Farm.**..... 1834—45. [*Continuation of*: Giornale, etc., 1824—33.] B.M.
- Cattaneo G. Farm.**..... Giornale di Farmacia, etc.; Cattaneo. Milan.
- Cb. Md. Wa.**..... 1824—33. [*Continued as*: Biblioteca, etc., 1834—45.] B.M.
- Cb. Mn.**..... Centralblatt für die Medicinischen Wissenschaften. Berlin.
1863— B.M.; Camb.U.i.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.;
Oxon.R.; R.C.Surg.; R.S.i.; U.C.L.i.
- Cb. Pl.**..... Centralblatt für Mineralogie, Geologie und Palaeontologie. Stuttgart.
1900— B.M.; Camb.U.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.;
Glasg.P.S.i.; Glasg.U.; N.H.M.; Oxon.R.; R.S.; S.K.
- C. CB.**..... Centralblatt für Physiologie. Leipzig, Wien.
1887— B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.;
Oxon.R.; R.C.Surg.; U.C.L.i.
- CE. I. P.**..... Chemisches Central-Blatt. Leipzig.
1856— Camb.U.i.; Chem.S.i.; N.H.M.; Oxon.R.; Pharm.S.i.;
P.O.; R.S.; S.K.; U.C.L.i.
- CE. I. T.**..... Minutes of Proceedings of the Institution of Civil Engineers, con-
taining Abstracts of the Papers and of the Discussions. London.
1837— B.M.; Camb.P.S.; Camb.U.; Dub.R.C.S.; Dub.R.D.S.;
Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.i.;
Glasg.U.; I.CE.; Oxon.B.; Oxon.R.i.; P.O.; R.Geogr.S.; R.S.;
S.K.; U.C.L.
- See I. CE. P.*
- CE. I. T.**..... Transactions of the Institution of Civil Engineers. London.
1836—42. B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.;
Dub.R.D.S.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.U.; I.CE.;
Oxon.B.; Oxon.R.; P.O.; R.Geogr.S.; R.S.; U.C.L.i.
- Cg. Int. Chron.**..... Congrès International de Chronométrie. Comptes Rendus des
Travaux, Procès-Verbaux, Rapports et Mémoires. Paris.
1889, 1900. Camb.U.; R.S.i.; S.K.
- Cg. Int. Hyg. C. R.**..... Congrès International d'Hygiène et de Demographie. Comptes-
Rendus [Arbeiten, Transactions, Actas]. Paris, etc.
1878— Glasg.P.S.i.; I.CE.i.; Oxon.R.i.; P.O.i.; R.C.Surg.i.
- Cg. Int. Md. C. R.**..... Comptes-Rendus [Atti, Verhandlungen, Transactions] du Congrès
International de Médecine. Paris, etc.
- Cg. Md. Int. At.**..... 1867— B.M.; Camb.U.i.; Glasg.P.S.i.; Oxon.R.; R.C.Surg.
See Int. Md. Cg. T. and Int. Md. Cg. Vh.
- C. Gz.**..... Chemical Gazette. London.
1842—59. B.M.; Camb.U.; Chem.S.; Dub.T.C.i.; Edinb.U.i.;
I.CE.i.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.; P.O.i.; S.K.;
U.C.L.
- Chambéry Mm. Ac. Sav.**... Mémoires de la Société Académique de Savoie. Chambéry.
1825— Camb.U.; Dub.R.I.A.; Dub.T.C.; N.H.M.; Oxon.B.; R.S.i.
See Sav. Ac. Mm.
- Charleston Md. J.**..... Charleston Medical Journal and Review; Gaillard, de Saussure, etc.
Charleston.

List of Serial Publications

- 1848—60. [*Continuation of*: The Southern Journal of Medicine, etc., 1846—47.] B.M.
Charleston South. J. Md. The Southern Journal of Medicine, etc.; Smith and Sinkler. Charleston.
 1846—47. [*Continued as*: Charleston Medical Journal and Review, 1848—60.] B.M.
Chemist..... The Chemist. London.
 1840—58. B.M.; Camb.U.i.; Chem.S.; Dub.T.C.i.; Edinb.U.i.; I.CE.i.; Oxon.B.; Pharm.S.; P.O.; R.C.Surg.; R.S.; S.K.i.
Chemnitz B...... Bericht der Naturwiss. Gesellsch. zu Chemnitz. Chemnitz.
 1859— Edinb.R.S.i.; N.H.M.; R.S.i.
Cherb. Mm. S. Ac...... Mémoires de la Société Académique de Cherbourg. Cherbourg.
 1833— B.M.; Camb.U.i.; Edinb.R.S.i.; N.H.M.i.; Oxon.B.i.
Cherb. Mm. S. Sc...... Mémoires de la Société Impériale des Sciences Naturelles de Cherbourg. Cherbourg.
Cherb. S. Sc. Mm...... B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; I.CE.i.; Linn.S.; N.H.M.; R.A.S.i.; R.S.; S.K.
Cherb. S. Sc. Nt. Mm......
Chili S. Sc. Act...... Actes de la Société Scientifique du Chili (Sociedad científica de Chile). Santiago.
 1892— B.M.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Geol.S.; Linn.S.i.; N.H.M.; R.S.i.
Christiania F...... Forhandlinger i Videnskabs-Selskabet i Christiania. Christiania.
 1859— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Geol.S.i.; Glasg.P.S.; N.H.M.; Oxon.B.; R.Geogr.S.i.; R.S.; U.C.L.i.
Christiania Skr. (Mth.-Nt. Kl.)..... Skrifter udgivne af Videnskabselskabet i Christiania. Mathematisk-Naturvidenskabelig Klasse. Christiania.
 1894— B.M.; Camb.P.S.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.P.S.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.; U.C.L.i.
Ciel et Terre..... Ciel et Terre. Revue populaire d'Astronomie, de Météorologie et de Physique du Globe. Bruxelles.
 1881— B.M.; Edinb.R.S.i.; M.O.; R.A.S.
Cincin. S. NH. J...... The Journal of the Cincinnati Society of Natural History. Cincinnati.
 1878— B.M.; Camb.P.S.; Edinb.R.S.; Geol.S.i.; N.H.M.; R.S.
Civing...... Der Civilingenieur: Zeitschrift für das Ingenieurwesen. Freiberg, Leipzig.
 1854—96. B.M.; Camb.U.i.; Dub.R.I.A.i.; I.CE.; P.O.
Clermont Mm. Ac. Sc...... Mémoires de l'Académie des Sciences, Belles Lettres, et Arts de Clermont-Ferrand. Clermont-Ferrand.
 1859— [*Continuation of*: Annales Scientifiques, etc., 1828—58.] B.M.; Camb.U.; Glasg.P.S.i.; R.S.i.
C. N...... The Chemical News and Journal of Physical Science. London.
 1860— Camb.P.S.; Camb.U.i.; Chem.S.; Dub.N.L.I.i.; Dub.R.C.S.i.; Dub.R.D.S.i.; Edinb.U.; Geol.M.; Geol.S.i.; Glasg.P.S.; I.CE.i.; N.H.M.; Oxon.B.i.; Oxon.R.; Pharm.S.; P.O.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
Cn. I. P...... Proceedings of the Canadian Institute, Toronto. Toronto.
 1879—90; 1897— [*Continuation of*: The Canadian Journal, 1853—78.] B.M.; Camb.P.S.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.i.; Edinb.U.; Geol.S.i.; Glasg.P.S.; I.CE.i.; Linn.S.; Math.S.i.; N.H.M.; Oxon.B.; P.O.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.i.
Cn. I. T...... Transactions of the Canadian Institute. Toronto.
 1889— B.M.; Camb.P.S.; Dub.R.D.S.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.; I.CE.i.; Linn.S.; Math.S.i.; N.H.M.; P.O.; R.A.S.; R.Geogr.S.; R.S.
Cn. J...... The Canadian Journal of Industry, Science, and Art. Toronto.
 1853—78. [*Continued as*: Proceedings of the Canadian Institute, 1879—] B.M.i.; Dub.R.I.A.; Edinb.R.S.; Geol.S.; I.CE.; N.H.M.; P.O.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.i.
Cn. Nt...... The Canadian Naturalist and Geologist, and Proceedings of the Natural History Society of Montreal. Montreal.
 1857—83. [*Continued as*: The Canadian Record of Science, 1884—] B.M.; Camb.U.i.; Edinb.U.i.; Geol.S.i.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.; R.S.; U.C.L.i.
Cn. Rc. Sc...... The Canadian Record of Science, including the Proceedings of the

List of Serial Publications

- Natural History Society of Montreal, and replacing the Canadian Naturalist. Montreal.
- 1884— [Continuation of: The Canadian Naturalist, 1857—83.] B.M.; Camb.U.i.; Dub.R.D.S.; Edinb.R.S.; Geol.S.i.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; R.S.; S.K.i.
- Cn. R. S. P. & T.** Proceedings and Transactions of the Royal Society of Canada. Montreal.
- 1883— Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Geol.M.i.; Geol.S.; Glasg.P.S.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.
- Coimbra I.** O Instituto, jornal scientifico e litterario; Forjaz. Coimbra.
- 1853— B.M.; R.Geogr.S.i.
- Colmar S. H. Nt. Bil.** ... Bulletin de la Société d'Histoire Naturelle de Colmar. Colmar.
- 1860—85. N.H.M.
- Colo. Sc. S. P.** Proceedings of the Colorado Scientific Society. Denver.
- 1883— Camb.P.S.i.; Chem.S.i.; Edinb.R.S.; Geol.S.i.; Glasg.P.S.; N.H.M.; P.O.
- Con. des Temps** Connaissance des Temps, à l'usage des Astronomes et des Navigateurs. Paris.
- 1679— B.M.i.; Camb.U.; Dub.T.C.; Glasg.U.i.; I.CE.i.; Oxon.B.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.i.
- Conegl. Scuola Vit. En.A.** Annali della R. Scuola di Viticoltura e di Enologia in Conegliano. Conegliano.
- 1892—93. [Continuation of: Nuova Rassegna di Viticoltura ed Enologia della R. Scuola di Conegliano, 1887—91.] [Continued as: La Revista. Periodico della R. Scuola di Viticoltura e di Enologia di Conegliano, 1895—] Kew Gardens.i.
- Conegl. Scuola Vit. En. Rv.** La Revista. Periodico della R. Scuola di Viticoltura e di Enologia di Conegliano. Conegliano.
- 1895— [Continuation of: Annali della R. Scuola di Viticoltura e di Enologia in Conegliano, 1892—93.] Kew Gardens.
- Conn. Ac. T.** Transactions of the Connecticut Academy of Arts and Sciences. New Haven.
- 1866— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Glasg.P.S.; Linn.S.; Math.S.i.; N.H.M.; Oxon.R.; P.O.; R.A.S.; R.Geogr.S.; R.S.; S.K.
- Conn. Mm. Ac.** Memoirs of the Connecticut Academy of Arts and Sciences. New Haven.
- 1810—16. Linn.S.i.; N.H.M.i.; R.S.
- Cornwall Gl. S. T.** Transactions of the Royal Geological Society of Cornwall. Penzance.
- 1818— B.M.i.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; Geol.M.; Geol.S.; Glasg.U.i.; I.CE.i.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.; R.S.; S.K.i.; U.C.L.i.
- Cornwall Pol. S. Rp.** Reports and Transactions of the Royal Polytechnic Society of Cornwall. Falmouth.
- Cornwall Pol. S. T.** { 1833— B.M.; Camb.U.i.; Dub.R.D.S.; Edinb.R.S.i.; Geol.M.i.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; M.O.i.; N.H.M.; Oxon.B.i.; P.O.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- Cosmos** Cosmos. Revue Encyclopédique Hebdomadaire des Progrès des Sciences; Moigno. Paris.
- 1852—70. B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; I.CE.i.; N.H.M.; Oxon.B.; P.O.; R.A.S.i.; R.S.; S.K.i.
- See Moigno Cosmos.*
- C. R.** Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences. Paris.
- 1835— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.; Edinb.R.S.i.; Edinb.U.; Geol.M.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.; Linn.S.; M.O.i.; N.H.M.; Oxon.B.; Oxon.R.i.; Pharm.S.i.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.
- Crc. Ac. Sc. Bil.** Bulletin International de l'Académie des Sciences de Cracovie. Cracovie.
- 1889— B.M.; Camb.U.; Chem.S.; Dub.R.I.A.i.; Edinb.R.S.; Geol.S.; Glasg.U.; N.H.M.; Oxon.B.; Oxon.R.i.; R.A.S.i.; R.S.; U.C.L.i.

List of Serial Publications

- Crell C. A.**..... Chemische Annalen für die Freunde der Naturlehre; Crell. Helmstädt.
1784—1804. B.M.; Camb.U.; Chem.S.; Glasg.P.S.i.; N.H.M.; P.O.; R.C.Surg.; R.S.; S.K.
- Crelle J.**..... Journal für die reine und angewandte Mathematik; Crelle. Berlin.
1826— B.M.; Camb.U.; Dub.N.L.I.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Glasg.U.; I.CE.i.; Math.S.i.; Oxon.B.(R.); R.S.; S.K.i.; U.C.L.
- See **Crelle J. Mth.**
- Crelle J. Bauk.**..... Journal für die Baukunst; Crelle. Berlin.
1829—51. B.M.; Camb.U.; Glasg.U.; P.O.
- Crelle J. Mth.**..... See **Crelle J.**
- Croydon Mscr. Cl. P. & T.**..... Proceedings and Transactions of the Croydon Microscopical and Natural History Club. Croydon.
1878— [Continuation of: Report, etc., 1871—78.] Camb.U.; Geol.S.i.; Glasg.P.S.i.; Linn.S.; N.H.M.; P.O.; U.C.L.i.
- C. S. J.**..... The [Quarterly] Journal of the Chemical Society of London. London.
1849— [Continuation of: Memoirs and Proceedings, etc., 1841—48.] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.M.i.; Geol.S.; Glasg.P.S.; I.CE.; N.H.M.i.; Oxon.B.; Oxon.R.i.; Pharm.S.; P.O.; R.C.Surg.; R.S.; S.K.; U.C.L.
- C. S. Mm.**..... Memoirs and Proceedings of the Chemical Society of London. London.
1841—48 [Continued as: The Quarterly Journal, 1849—] B.M.; Camb.P.S.; Chem.S.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Geol.S.; Glasg.P.S.; Glasg.U.i.; N.H.M.; Oxon.B.(R.); Pharm.S.; P.O.; R.S.; S.K.; U.C.L.
- C. S. P.**..... Proceedings of the Chemical Society. London.
1885— B.M.; Camb.P.S.; Camb.U.i.; Chem.S.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.i.; Geol.M.i.; Glasg.U.; N.H.M.i.; Oxon.R.; Pharm.S.; P.O.; R.S.; S.K.; U.C.L.
- Cuyper Rv. Un.**..... Revue Universelle des Mines, de la Métallurgie, etc.; de Cuyper. Paris, Liège.
1857— B.M.; Camb.U.; Dub.R.I.A.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; N.H.M.; P.O.; S.K.
- See **Rv. Un. Mines.**
- C. Ztg.**..... Chemiker-Zeitung. Central-Organ für Chemiker, Apotheker, Techniker, Ingenieure, Fabrikanten. Cöthen.
1877— Chem.S.i.; P.O.i.; S.K.i.
- Cztg. Opt.**..... Central-Zeitung für Optik und Mechanik. Leipzig.
1880— Edinb.U.i.; P.O.i.; R.S.i.
- D. Alpvr. Z.**..... Zeitschrift des Deutschen [und des Oesterreichischen] Alpenvereins. München.
1870— B.M.; Camb.U.; Oxon.B.; R.Geogr.S.
- Danzig Schr.**..... Schriften der Naturforschenden Gesellschaft in Danzig. Danzig.
1863— [Continuation of: Neueste Schriften, etc., 1820—62.] Camb.P.S.; Camb.U.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Linn.S.i.; N.H.M.; Oxon.R.i.; R.S.; S.K.i.
- Darmst. Notb.**..... Notizblatt des Vereins für Erdkunde und verwandte Wissenschaften zu Darmstadt und des Mittelrheinischen Geologischen Vereins. Darmstadt.
1855— B.M.; Geol.M.; Geol.S.; Glasg.P.S.i.; N.H.M.i.; R.Geogr.S.; R.S.i.; S.K.
- Dax S. Borda Bll.**..... Bulletin de la Société de Borda à Dax. Dax.
1876— N.H.M.; U.C.L.i.
- D. Bt. Gs. B.**..... Berichte der Deutschen Botanischen Gesellschaft. Berlin.
1883— B.M.; Camb.U.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.; Pharm.S.; R.S.; S.K.; U.C.L.
- D. C. Gs. B.**..... Berichte der Deutschen Chemischen Gesellschaft. Berlin.
1868— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.; Glasg.P.S.; Glasg.U.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
- See **Berl. B.**
- Delft Éc. Pol. A.**..... Annales de l'École Polytechnique de Delft. Leide.

List of Serial Publications

- 1885—97. Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Math.S.; R.A.S.; R.S.; S.K.
Denison Un. Sc. Lib. Bil. Bulletin of the Scientific Laboratories of Denison University.
 Granville, Ohio.
 1885— B.M.; Camb.P.S.; Dub.R.I.A.; Edinb.R.S.; N.H.M.; P.O.; S.K.i.
Der Nf. Der Naturforscher. Halle.
 1774—1804. B.M.; Camb.U.; Geol.S.i.; Glasg.P.S.i.; Linn.S.; N.H.M.; R.S.i.; S.K.
Des Moines Anal. The Analyst: a monthly Journal of Pure and Applied Mathematics.
 Des Moines, Iowa.
 1874—83. Camb.U.; Edinb.R.S.; R.S.
Devon. As. T. Reports and Transactions of the Devonshire Association for the Advancement of Science, Literature, and Art. Plymouth, London.
 1862— Camb.U.i.; Geol.M.; Geol.S.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.; R.S.; S.K.
D. Gl. Gs. Z. Zeitschrift der Deutschen Geologischen Gesellschaft. Berlin.
 1849— B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.U.i.; N.H.M.; Oxon.R.; R.S.i.; S.K.i.
D. Gs. Ostas. Mt. Mittheilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens. Yokohama.
 1873— B.M.; Edinb.R.S.i.; Geol.S.i.; R.Geogr.S.; S.K.
Dijon Ac. Mm. Mémoires de l'Académie des Sciences, Arts, et Belles-lettres de Dijon. Dijon.
Dijon Ac. Sc. Mm. 1769— B.M.i.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.i.; Geol.S.i.; N.H.M.; Oxon.B.i.; R.A.S.; R.C.Surg.i.; R.Geogr.S.i.; R.S.i.; S.K.i.
Dijon Mm. Ac.
Dijon Sé. Ac. Séances publiques de l'Académie des Sciences, Arts, et Belles-lettres de Dijon. Dijon.
 1810—29. B.M.i.; N.H.M.
Dingler Polytechnisches Journal; Dingler. Stuttgart.
 1820— B.M.; Camb.U.; Chem.S.i.; Dub.N.L.I.i.; Dub.R.C.S.i.; Dub.R.D.S.i.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; P.O.; R.S.i.; S.K.
D. Meere Jbr. Jahresbericht der Commission zur Wissenschaftlichen Untersuchung der Deutschen Meere in Kiel. Berlin.
 1871—93. [Continued as: Wissenschaftliche Meeresuntersuchungen, etc., 1896—] Camb.U.; Edinb.R.S.i.; Glasg.P.S.i.; Linn.S.; M.O.; N.H.M.; Oxon.R.; R.Geogr.S.i.; R.S.i.; S.K.
D. Ml. Gs. Nb. Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft. Frankfurt am Main.
 1869— B.M.; Camb.U.; Glasg.P.S.i.; N.H.M.
D. Mth. Vr. Jbr. Jahresbericht der deutschen Mathematiker-Vereinigung. Berlin, Leipzig.
 1890— Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Math.S.i.; Oxon.B.; R.S.
D. Nf. B. Bericht über die Versammlung der Deutschen Naturforscher und Aerzte.
 1822—83. Irregular, *see* Tageblatt. Camb.U.i.; Geol.S.i.; N.H.M.i.; Oxon.R.i.; R.C.Surg.i.; R.S.i.; S.K.i.
See D. Nf. Vam. B.
D. Nf. Festschr. Festschrift für die 59. Versammlung Deutscher Naturforscher und Aerzte. Berlin.
 1886. Dub.R.I.A.; N.H.M.; Oxon.R.; S.K.
D. Nf. Tbl. Tageblatt der... Versammlung Deutscher Naturforscher und Aerzte.
 1836—89. Irregular, *see* B. and Vh. Camb.U.; Geol.S.i.; N.H.M.; Oxon.R.i.; R.C.Surg.i.
D. Nf. Vh. Verhandlungen der Gesellschaft Deutscher Naturforscher und Aerzte. Leipzig.
 1890— [Continuation of: Bericht, Tagebl. etc., 1822—89.] Camb.U.; N.H.M.; Oxon.R.; R.C.Surg.
See D. Nf. B.
D. Nf. Vam. B.
Dn. Vd. Selsk. Skr. Det Kongelige Danske Videnskabernes Selskabs Skriver. Kiöbenhavn.
 1801—18. B.M.; Camb.P.S.i.; Camb.U.; Edinb.R.S.; N.H.M.; Oxon.B.; R.S.
See Kiöb. Dn. Vd. Selsk. Skr.

List of Serial Publications

- Donders Arch.** Archiv für die Holländischen Beiträge zur Natur- und Heilkunde; Donders. Utrecht.
1858—64. [Continued as: Nederlandsch Archief voor Genees- en Natuurkunde, 1865—70.] B.M.; Camb.U.; N.H.M.; R.C.Surg.; R.S.
- Donders Ndl. Gast. Oogl. Vs.** Jaarlijksch Verslag betreffende de Verpleging en 't Onderwijs in het Nederlandsch Gasthuis voor Ooglijders; Donders. Utrecht.
1860—85. [Continued as: Nederlandsch Gasthuis voor Behoeftige en Minvermogene Ooglijders te Utrecht. Verslag, 1885—] Glasg.P.S.i.; R.S.
- Dorpat Sb.** Sitzungsberichte der Naturforscher-Gesellschaft zu Dorpat. Dorpat.
1853— Dub.R.I.A.i.; Edinb.R.S.i.; Geol.S.; N.H.M.; R.S.i.; S.K.i.
- Dorpat Schr.** Schriften herausgegeben von der Naturforscher-Gesellschaft bei der Universität Dorpat. Dorpat.
1884— B.M.; Camb.U.; Edinb.R.S.i.; N.H.M.; Oxon.R.
- Dorset FC. P.** Proceedings of the Dorset Natural History and Antiquarian Field Club. Sherborne.
1877— B.M.; Camb.P.S.; Camb.U.i.; Geol.S.i.; Linn.S.; N.H.M.; Oxon.B.i.
- Douai Mm. S. Ag.** Mémoires de la Société d'Agriculture, de Sciences et d'Arts [du Département du Nord] séant à Douai. Douai.
1826—89. B.M.; Camb.U.i.; Dub.T.C.i.; Oxon.B.; R.S.i.
- Doubs S. Mm.** Mémoires et Comptes Rendus de la Société [Libre] d'Émulation du Doubs. Besançon.
1841— B.M.; N.H.M.i.
- D. Ps. Gs. Vh.** Verhandlungen der Deutschen Physikalischen Gesellschaft. Leipzig.
1899— [Continuation of: Verhandlungen der Physikalischen Gesellschaft in Berlin, 1882—98.] Camb.P.S.; Camb.U.; Edinb.R.S.; Edinb.U.i.; Glasg.U.; N.H.M.; Oxon.B.(R.); P.O.; R.A.S.; R.S.; S.K.; U.C.L.i.
- Dresden Ausz. Protokol.** Auszüge aus den Protokollen der Gesellschaft für Natur- und Heilkunde in Dresden. Dresden.
1832—34. B.M.; Glasg.P.S.i.; R.S.
- Dresden Erdk. Jbr.** Jahresbericht des Vereins für Erdkunde zu Dresden. Dresden.
1865— B.M.; Geol.S.i.; Glasg.P.S.i.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.i.; S.K.
- Dresden Isis Festschr.** Festschrift der Naturwissenschaftlichen Gesellschaft Isis in Dresden. Dresden.
1885. B.M.; Dub.R.I.A.; Geol.S.; Glasg.P.S.i.; N.H.M.; S.K.
- Dresden Isis Sb.** Sitzungsberichte der Naturwissenschaftlichen Gesellschaft Isis in Dresden. Dresden.
1861— Camb.U.i.; Dub.T.C.; Geol.S.; N.H.M.; S.K.
See **Dresden Sb. Isis.**
- Dresden Jbr. Nt. Heilk.** Jahresberichte [Sitzungsberichte] der Gesellschaft für Natur- und Heilkunde. Dresden.
1858— Glasg.P.S.i.; R.C.Surg.i.; R.S.i.; S.K.i.
See **Dresden Sb. Nt. Heilk.**
- Dresden Lndw. V.-St.** Die landwirthschaftlichen Versuchs-Stationen. Organ für wissenschaftliche Forschungen auf dem Gebiete der Landwirthschaft. Dresden, Chemnitz.
1859— B.M.i.; Camb.U.; Chem.S.i.; Glasg.U.i.; Oxon.B.; P.O.i.; R.S.i.
See **Lndw. V.-St.**
- Dresden Sb. Isis** See **Dresden Isis Sb.**
- Dresden Sb. Nt. Heilk.** See **Dresden Jbr. Nt. Heilk.**
- Dubl. J. Md. C. Sc.** Dublin Journal of Medical and Chemical Science. Dublin.
1832—45. [Continued as: The Dublin [Quarterly] Journal of Medical Science, 1846—] B.M.; Camb.U.i.; Dub.N.L.I.i.; Dub.R.D.S.i.; Dub.T.C.i.; Pharm.S.i.; R.C.Surg.
- Dubl. J. Md. Sc.** The Dublin [Quarterly] Journal of Medical Science. Dublin.
- Dubl. QJ. Md. Sc.** 1846— [Continuation of: Dublin Journal of Medical and Chemical Science, 1832—45.] B.M.; Camb.U.i.; Dub.N.L.I.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; Oxon.B.(R.); Pharm.S.i.; P.O.; R.C.Surg.; U.C.L.i.
- Dubl. R. S. J.** Journal of the Royal Dublin Society. Dublin.
1856—78. B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Geol.M;

List of Serial Publications

- Geol.S.; Glasg.U.i.; I.CE.i.; Linn.S.; M.O.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.
Dubl. S. J...... Transactions and Journal of the Dublin Society. Dublin.
 1799—1810. B.M.; Dub.N.L.I.; Dub.R.D.S.; Dub.T.C.; Geol.S.i.; N.H.M.; Oxon.B.i.; R.S.; S.K.
See **Dubl. S. T.**
Dubl. S. Sc. P...... The Scientific Proceedings of the Royal Dublin Society. Dublin.
 1877— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.; I.CE.; Linn.S.; Math.S.i.; M.O.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
Dubl. S. Sc. T...... The Scientific Transactions of the Royal Dublin Society. Dublin.
 1877— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.; I.CE.; Linn.S.; Math.S.; M.O.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
Dubl. S. T...... *See* **Dubl. S. J.**
Durham Un. Ph. S. P.... Proceedings of the University of Durham Philosophical Society. Newcastle-upon-Tyne.
 1900— Camb.P.S.; Camb.U.i.; Edinb.R.S.; Geol.S.i.; Glasg.P.S.i.; N.H.M.; Oxon.B.; S.K.i.
D. Vjschr. Gandhpf...... Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege. Braunschweig.
 1869— B.M.; Camb.U.i.; Glasg.P.S.i.; I.CE.i.; Oxon.R.; U.C.L.i.
D. Z. Thmd...... Deutsche Zeitschrift für Thiermedizin und vergleichende Pathologie. Leipzig.
 1875— Camb.U.; Glasg.P.S.i.; Oxon.R.; R.C.Surg.
Eastbourne NH. S. Pp. (& T.)..... { Papers (Transactions) of the Eastbourne Natural History Society with Annual Report. Eastbourne.
Eastbourne NH. S. T.... { 1869— Geol.S.i.; N.H.M.i.; R.S.i.; S.K.i.
Éclair. Élect...... L'Éclairage Électrique. Paris.
 1894— B.M.; Glasg.U.i.; I.CE.; P.O.
Edinb. FC. T...... Transactions of the Edinburgh Naturalists' Field Club. Edinburgh.
 1881— Camb.U.; Glasg.P.S.i.; Linn.S.i.; N.H.M.
Edinb. Gl. S. T...... Transactions of the Edinburgh Geological Society. Edinburgh.
 1868— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.i.; Geol.M.; Geol.S.; Glasg.P.S.; N.H.M.; P.O.; R.Geogr.S.; R.S.; U.C.L.
Edinb. J. Md. Sc...... Edinburgh Journal of Medical Science. Edinburgh.
 1826—27. B.M.; Camb.U.; Dub.T.C.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; R.C.Surg.
Edinb. J. Nt. Gg. Sc...... The Edinburgh Journal of Natural and Geographical Science. Edinburgh.
 1830—31. B.M.; Camb.U.; Edinb.R.S.; Edinb.U.; Linn.S.; N.H.M.; Oxon.B.i.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.
Edinb. J. Sc...... The Edinburgh Journal of Science, exhibiting a view of the progress of discovery in Natural Philosophy, Chemistry, Mineralogy, Geology, Botany, etc.; David Brewster. Edinburgh.
 1824—1832. [Continued in: The London and Edinburgh Philosophical Magazine, etc., 1832—] B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.; M.O.i.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.; R.C.Surg.; R.S.; S.K.
Edinb. M. J. Md. Sc.... London and Edinburgh Monthly Journal of Medical Science. London, Edinburgh.
 1841—55. [Continued as: Edinburgh Medical Journal, 1855—] B.M.; Glasg.P.S.i.; Pharm.S.i.; R.C.Surg.
Edinb. Mm. Wern. S.... Memoirs of the Wernerian Natural History Society. Edinburgh.
 1808—39. B.M.; Camb.U.i.; Dub.R.D.S.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
See **Edinb. Wern. S. Mm.**
Edinb. Mth. S. P...... Proceedings of the Edinburgh Mathematical Society. London, Edinburgh.

List of Serial Publications

- 1883— B.M.; Camb.P.S.; Camb.U.; Edinb.R.S.; Edinb.U.;
Glasg.U.; Math.S.; R.S.i.
- Edinb. N. Ph. J.** The Edinburgh New Philosophical Journal, exhibiting a view of the
progressive Improvements, etc. in the Sciences, etc.; Robert
Jameson. Edinburgh.
- 1826—64. [*Continuation of:* The Edinburgh Philosophical Journal,
1819—26.] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.T.C.i.;
Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.;
Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.;
R.Geogr.S.i.; R.S.; S.K.
- Edinb. Ph. J.** The Edinburgh Philosophical Journal, exhibiting a view of the
Progress of Discovery in Natural Philosophy, etc.; David Brewster
and Robert Jameson. Edinburgh.
- 1819—26. [*Continued as:* The Edinburgh New Philosophical
Journal, 1826—64.] B.M.; Camb.P.S.; Camb.U.; Chem.S.;
Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.; Glasg.U.;
I.CE.; Linn.S.i.; N.H.M.; Oxon.B.i.; Oxon.R.; Pharm.S.; P.O.;
R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Edinb. P. Ps. S.** Proceedings of the Royal Physical Society of Edinburgh. Edinburgh.
- 1854— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.; Glasg.U.i.; Linn.S.;
N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.S.; S.K.; U.C.L.i.
- Edinb. P. R. S.** Proceedings of the Royal Society of Edinburgh. Edinburgh.
- Edinb. R. S. P.** 1845— B.M.i.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.;
Edinb.R.S.; Edinb.U.; Geol.M.i.; Geol.S.; Glasg.P.S.; Glasg.U.;
I.CE.; Linn.S.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.i.; Oxon.R.;
Pharm.S.i.; P.O.i.; R.A.S.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.;
U.C.L.
- Edinb. R. S. T.** Transactions of the Royal Society of Edinburgh. Edinburgh.
- 1788— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.; Dub.
R.I.A.; Edinb.R.S.; Edinb.U.; Geol.M.i.; Geol.S.; Glasg.P.S.;
Glasg.U.; I.CE.; Linn.S.; Math.S.i.; N.H.M.; Oxon.B.i.; Oxon.R.;
P.O.i.; R.A.S.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.;
U.C.L.
- Edinb. Sc. S. Arts P.** See **Edinb. T. R. S.**
- Edinb. Sc. S. Arts T.** Transactions of the Royal Scottish Society of Arts. Edinburgh.
- 1841— B.M.i.; Camb.U.; Dub.R.D.S.; Edinb.R.S.; Edinb.U.;
Glasg.P.S.; Glasg.U.; I.CE.; P.O.; R.S.; S.K.
- Edinb. T. R. S.** See **Edinb. R. S. T.**
- Edinb. T. Sc. S. Arts.** See **Edinb. Sc. S. Arts P. and Sc. S. Arts T.**
- Edinb. Wern. S. Mm.** ... See **Edinb. Mm. Wern. S.**
- Educ. Times** The Educational Times, and Journal of the College of Preceptors.
London.
- 1847— B.M.; Camb.P.S.i.; Camb.U.i.; Dub.N.L.I.; Glasg.U.i.;
Math.S.i.; Oxon.B.i.; Oxon.R.i.; R.S.i.; S.K.i.
- Elect.** The Electrician. London.
- 1862— B.M.i.; Camb.P.S.i.; Camb.U.i.; Dub.N.L.I.i.; Dub.
R.C.S.i.; Edinb.R.S.i.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.;
I.CE.i.; Oxon.B.i.; Oxon.R.i.; P.O.; R.S.i.; S.K.; U.C.L.i.
- Elect. Rv.** The Electrical Review. London.
- 1892— [*Continuation of:* The Telegraphic Journal and Electrical
Review, 1872—91.] B.M.; Camb.U.; Dub.N.L.I.; Edinb.U.;
Glasg.P.S.; Glasg.U.; I.CE.; P.O.; R.S.; S.K.
- Electr. S. P.** The Transactions and Proceedings of the London Electrical Society.
London.
- Electr. S. T.** 1837—40. [*Continued as:* Proceedings, 1841—43.] B.M.; Camb.U.i.;
Glasg.P.S.i.; I.CE.i.; Oxon.B.; Pharm.S.; P.O.; R.S.; S.K.
- Elekttech. Z.** Elektrotechnische Zeitschrift. Berlin, München.
- 1880— B.M.; Glasg.U.; I.CE.; P.O.; S.K.i.
- Emden Nf. Gs. Jbr.** Jahresbericht.....der Naturforschenden Gesellschaft in Emden.
Emden.
- 1837— Dub.R.I.A.; R.S.
- E. Mg.** The Entomological Magazine. London.
- 1833—38. B.M.; Camb.U.; Edinb.U.i.; Geol.S.; Glasg.U.; Linn.S.;
N.H.M.; Oxon.B.
- Eng. S. T.** Transactions of the Society of Engineers. London.

List of Serial Publications

- 1860— B.M.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Glasg.P.S.i.;
Glasg.U.i.; I.CE.; Oxon.B.; P.O.; R.S.i.; U.C.L.
- Ens. Mth.**..... L'Enseignement Mathématique. Revue Internationale. Paris.
1899— Math.S.; S.K.
- Erdm. J. Pr. C.**..... Journal für praktische Chemie; Erdman, etc. Leipzig.
1834— [Continuation of: Journal für technische und ökonomische
Chemie, 1828—33.] B.M.; Camb.U.; Chem.S.; Dub.N.L.I.i.;
Dub.R.C.S.i.; Dub.R.D.S.i.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.;
N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.;
S.K.; U.C.L.i.
- See J. Pr. C.*
- Erdm. J. Tech. C.**..... Journal für technische und ökonomische Chemie; Erdman. Leipzig.
1828—33. [Continued as: Journal für praktische Chemie, 1834—]
B.M.; Chem.S.; N.H.M.; P.O.; R.S.; S.K.
- Erfurt Ak. Jb.**..... Jahrbücher der königlichen Akademie gemeinnütziger Wissen-
schaften zu Erfurt. Erfurt.
1860— B.M.; N.H.M.
- Erlang. Ab.**..... Abhandlungen der Physikalisch-Medicinischen Societät in Erlangen.
Frankfurt-am-Main.
1810—12. B.M.; Glasg.P.S.i.; R.C.Surg.; R.S.; U.C.L.i.
- Erlang. Ps. Md. S. Sb.**... Sitzungsberichte der Physikalisch-Medicinischen Societät zu Er-
langen. Erlangen.
- Erlang. Sb. Ps. Md. S.**... { 1864— B.M.; Camb.P.S.; Dub.R.D.S.; Edinb.R.S.i.; Glasg.U.i.;
Linn.S.i.; Math.S.i.; N.H.M.; R.C.Surg.i.; R.S.i.
- Erlenmeyer Z.**..... Zeitschrift für Chemie und Pharmacie etc.; Erlenmeyer. Erlangen,
Heidelberg.
1860—64. [Continued as: Zeitschrift für Chemie, 1865—71.] B.M.;
Camb.U.; Chem.S.; N.H.M.; Oxon.R.i.; S.K.i.
- Erman Arch. Rs.**..... Archiv für wissenschaftliche Kunde von Russland; Erman. Berlin.
1841—67. B.M.; Camb.U.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.i.;
S.K.
- Essex I. Bil.**..... Bulletin of the Essex Institute. Salem (Mass.).
1869— [Continuation of: Proceedings, etc., 1848—68.] Camb.P.S.;
Edinb.R.S.i.; Geol.S.i.; Glasg.P.S.i.; Linn.S.i.; N.H.M.;
Oxon.R.i.; P.O.i.; R.Geogr.S.; R.S.; S.K.
- Essex I. P.**..... Proceedings of the Essex Institute. Salem (Mass.).
1848—68. [Continued as: Bulletin, etc., 1869—] B.M.i.; Camb.P.S.;
Dub.R.I.A.; Edinb.R.S.i.; Linn. S.i.; N.H.M.; Oxon.R.i.; R.S.;
S.K.
- Essex Ntlst.**..... The Essex Naturalist; being the Journal of the Essex Field Club.
Buckhurst Hill.
1887— [Continuation of: Transactions of the Essex Field Club,
1880—86.] B.M.; Camb.P.S.; Camb.U.; Edinb.R.S.; Geol.M.;
Geol.S.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.B.; R.S.;
U.C.L.
- Eure Rec. S. Ag.**..... { Recueil de la Société d'Agriculture, Sciences, Arts, et Belles-Lettres
du département de l'Eure. Evreux.
- Eure S. Ag. Rec.**..... { 1830—39. B.M.; Camb.U.; Oxon.B.; R.S.
- Évk.**..... { A'Magyar Tudós Társaság' Évkönyvei. Pest.
1833—46.
A'Magyar Tudományos Akademia Évkönyvei. Budá.
1860—89. B.M.; Edinb.R.S.i.; Geol.S.i.; N.H.M.; Oxon.B.;
R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- See Mag. Tud. Ak. Évk.*
- Exner Rpm.**..... Repertorium der Physik; Exner. München, Leipzig.
1883—91. [Continuation of: Repertorium für physikalische Technik,
etc.; Carl, 1865—82.] B.M.; Camb.U.i.; Dub.N.L.I.i.; Edinb.U.;
I.CE.i.; Oxon.R.; P.O.; R.S.; S.K.
- Fechner Cb.**..... Centralblatt für Naturwissenschaften und Anthropologie; Fechner.
Leipzig.
1853—54. B.M.; Glasg.P.S.i.; N.H.M.
- Fed. I. Mn. E. T.**..... Transactions of the Federated Institution of Mining Engineers.
Newcastle-upon-Tyne.
1889—98. [Continued as: Transactions of the Institution of Mining
Engineers, 1898—] Camb.U.; Edinb.R.S.i.; Geol.M.; Geol.S.;
Glasg.P.S.; Glasg.U.; I.CE.; Oxon.B.; Oxon.R.i.; P.O.; S.K.

List of Serial Publications

- Férussac Bll. Sc. Mth.** ... Bulletin des Sciences Mathématiques, Astronomiques, Physiques et Chimiques; de Férussac. Paris.
1824—31. B.M.; Edinb.U.i.; Geol.S.; Glasg.U.i.; Oxon.R.; P.O.; R.C.Surg.; U.C.L.
- Férussac Bll. Sc. Nt.** ... Bulletin des Sciences Naturelles et de Géologie; de Férussac. Paris.
1824—31. B.M.; Geol.S.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.B.; P.O.; R.C.Surg.; R.S.
- Finist. S. Sc. Bll.** ... Bulletin de la Société d'Études Scientifiques du Finistère. Morlaix.
1879— N.H.M.
- Firenze Ac. Georg. At.** ... Atti della R. Accademia economico-agraria dei Georgofili. Firenze.
1817— [Continuation of: Atti della (Real) Società Economica di Firenze ossia de' Georgofili, 1791—1812.] B.M.; Camb.U.; Dub.T.C.i.; Edinb.R.S.i.; Oxon.B.
See Firenze At. Ac. Georg.
- Firenze A. Ms. Fis.** ... Annali del R. Museo di Fisica e Storia Naturale. Firenze.
1866. Glasg.P.S.i.; M.O.; N.H.M.; Oxon.B.i.; R.A.S.; R.S.; S.K.
- Firenze A. Ms. Imp.** ... Annali del Museo Imperiale di Fisica e Storia Naturale di Firenze.
Firenze.
1808—10. B.M.; Camb.U.i.; M.O.; N.H.M.; Oxon.B.; R.A.S.; R.S.i.; S.K.
- Firenze At. Ac. Georg.** ... *See Firenze Ac. Georg. At.*
- Firenze R. I. Pb.** ... Pubblicazioni del R. Istituto di Studi Superiori Pratici e di Perfezionamento in Firenze. Sezione di Scienze Fisiche e Naturali.
Firenze.
1877— B.M.; Glasg.P.S.i.; N.H.M.; R.S.
- Firenze S. Georg. At.** ... Atti della (Real) Società Economica di Firenze ossia de' Georgofili.
Firenze.
1791—1812. [Continued as: Atti della R. Accademia economico-agraria dei Georgofili, 1817—] B.M.; Camb.U.
- Flora** ... Flora, oder Allgemeine Botanische Zeitung; herausgegeben von der Königl. Bayer. Botanischen Gesellschaft. Regensburg.
1818— Camb.U.i.; Dub.R.D.S.; Edinb.R.S.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.; N.H.M.; R.S.i.; S.K.; U.C.L.i.
- Föld. Közl.** ... Földtani Közöny. Havi folyóirat kiadja a Magyarhoni Földtani Társulat. (Geologische Mittheilungen.) Zeitschrift der Ungarischen Geologischen Gesellschaft. Budapest.
1872— B.M.; Camb.U.i.; Geol.M.; Geol.S.; N.H.M.; R.S.i.; S.K.i.
- Forsch. Ag.-Ps.** ... Forschungen auf dem Gebiete der Agrikultur-Physik. Heidelberg.
1878—98. Chem.S.; P.O.
- Förster Al. Bauztg.** ... Allgemeine Bauzeitung; Förster. Wien.
1836— B.M.; Camb.U.; I.CE.i.; P.O.
- Franklin I. J.** ... Journal of the Franklin Institute of the State of Pennsylvania.
Philadelphia.
1828— B.M.; Camb.U.; Chem.S.i.; Dub.R.I.A.; Geol.S.i.; Glasg.P.S.i.; I.CE.; M.O.i.; Oxon.B.; P.O.; R.A.S.i.; R.Geogr.S.; R.S.; U.C.L.i.
- Fr. An. Mét.** ... Annuaire Météorologique de la France. Paris.
1849—52. [Continued as: Annuaire de la Société Météorologique de France, 1853—] B.M.; Camb.U.; Dub.T.C.; Glasg.U.i.; M.O.; R.S.
See An. Mét. Fr.
- Fr. Cg. Sc.** ... Sessions des Congrès Scientifiques de France.
1833—79. B.M.; Camb.U.; N.H.M.; R.C.Surg.i.
- Freiberg Jb. Berg.-Hm.** ... Jahrbuch für den Berg- und Hüttenmann. Herausg. von der Königl. Berg-Akademie zu Freiberg. Freiberg.
1837—72. [Continued as: Jahrbuch für das Berg- und Hüttenwesen, 1873—] B.M.; Glasg.P.S.i.; N.H.M.; P.O.i.; R.S.i.; S.K.i.
- Freiburg B.** ... Berichte über die Verhandlungen der Naturforschenden Gesellschaft zu Freiburg i. B. Freiburg i. B.
1855— B.M.; Camb.U.i.; Dub.R.I.A.; Linn.S.i.; N.H.M.; Oxon.R.; R.C.Surg.i.; R.S.; S.K.
- Fresenius Z.** ... Zeitschrift für Analytische Chemie; Fresenius. Wiesbaden.
1862— B.M.; Camb.U.; Chem.S.; Dub.N.L.L.; Edinb.U.i.; Glasg.P.S.; N.H.M.; Oxon.R.; Pharm.S.; P.O.; R.C.Surg.; R.S.; S.K.
- Frkf. a. M. Ps. Vr. Jbr.** ... { Jahresbericht des Physikalischen Vereins zu Frankfurt am Main.
Frkf. Jbr. Ps. Vr. { Frankfurt am Main.
1838— B.M.i.; Glasg.U.i.; M.O.i.; P.O.i.; R.S.i.; S.K.i.

List of Serial Publications

- Frkf. Ps. Vr. Jb.** Jahrbuch zur Verbreitung Naturwissenschaftlicher Kenntnisse, veranstaltet vom Physikalischen Vereine zu Frankfurt. Frankfurt.
1831. Glasg.P.S.i.; R.S.; S.K.
- Froriep Not.** Notizen aus dem Gebiete der Natur- und Heilkunde; Froriep. Erfurt, Weimar.
1821—62. B.M.i.; Camb.U.i.; Glasg.U.i.; N.H.M.; Oxon.R.i.; R.C.Surg.; R.S.i.
- Fr. S. Ag. Bil.** Bulletin des Séances de la Société (Centrale) d'Agriculture de France. Paris.
1837— P.O.i.
- Fr. S. Ag. Mm.** Mémoires d'Agriculture, d'Économie rurale et domestique publiés par la Société d'Agriculture. Paris.
1801— B.M.; Edinb.R.S.i.; Oxon.B.
- Fr. S. Bt. Bil.** Bulletin de la Société Botanique de France. Paris.
1854— B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.D.S.; Dub.R.I.A.i.; Dub.T.C.i.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.; Pharm.S.i.; S.K.
- Fr. S. Mét. An.** See **Par. Bil. S. Bt.**
Annuaire de la Société Météorologique de France. Paris.
1853— [Continuation of: Annuaire Météorologique de la France, 1849—52.] B.M.; Camb.U.; Dub.T.C.i.; Glasg.U.i.; M.O.
- Fr. S. Mét. N. Mét.** Nouvelles Météorologiques publiées sous les auspices de la Société Météorologique de France. Paris.
1868—76. B.M.i.; M.O.; R.S.i.
- Fr. S. Mn. Bil.** Bulletin de la Société Minéralogique de France. Menlan, Paris.
1878— B.M.; Dub.T.C.; Geol.M.; Geol.S.; N.H.M.; Oxon.R.; R.S.; S.K.
- Fr. S. Z. Bil.** Bulletin de la Société Zoologique de France. Paris.
1876— B.M.; Camb.U.; Edinb.R.S.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.R.i.; S.K.
- Feschr. Md.** Fortschritte der Medicin. Berlin.
1883— Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Oxon.B.; R.C.Surg.
- Feschr. Mth.** Jahrbuch über die Fortschritte der Mathematik. Berlin.
1868— B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.C.S.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; Math.S.; Oxon.R.; R.S.; U.C.L.
- Feschr. Ps.** Die Fortschritte der Physik. Berlin.
1845— Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Edinb.U.; Glasg.U.; I.CE.i.; Oxon.B.(R.); P.O.; R.A.S.i.; R.S.; S.K.; U.C.L.
- Feschr. Röntgenstr.** Fortschritte auf dem Gebiete der Röntgenstrahlen. Hamburg.
1897— Glasg.P.S.i.; Oxon.R.; R.S.; S.K.
- Gand. A. Ac.** Annales Academiæ Gandavensis. Gandavi (Ghent).
1819—31. B.M.; Camb.U.; N.H.M.; Oxon.B.; R.S.
- G. Arcad.** Giornale Arcadico di Scienze, etc. Roma.
1819—71. B.M.; N.H.M.; Oxon.B.
- Gard Aperçu Tr.** Notice [ou Aperçu analytique] des Travaux de l'Académie Royale du Gard. Nîmes.
1807—? B.M.; Camb.U.; Oxon.B.
- Gard. Chron.** See **Gard Not. Tr. Ac.**
The Gardener's Chronicle. London.
1841— Camb.U.; Dub.N.L.I.i.; Dub.T.C.i.; Edinb.U.i.; Linn.S.; N.H.M.; Oxon.B.; P.O.; S.K.i.
- Gard Not. Tr. Ac.** } See **Gard Aperçu Tr.**
Gard Tr. Ac. }
- Gauss Resultate** Resultate aus den Beobachtungen des Magnetischen Vereins; Gauss und Weber. Göttingen, Leipzig.
1837—42. B.M.; Camb.U.; Chem.S.; R.S.
- Gehlen J.** Journal für die Chemie und Physik; Gehlen. Berlin.
1806—10. B.M.; Edinb.R.S.; Edinb.U.i.; Glasg.U.; N.H.M.; Oxon.R.; R.S.
- Gen. Bil. I. Nt.** Bulletin de l'Institut National Gènevois. Genève.
1853— B.M.; Camb.U.; Dub.R.D.S.; N.H.M.; Oxon.B.i.; P.O.i.; R.S.

See **Gen. I. Nt. Bil.**

List of Serial Publications

- Gén. Civ.** Le Génie Civil. Revue Générale des Industries Françaises et Étrangères, etc. Paris.
1880— B.M.; I.CE.; P.O.; S.K.
- Gen. I. Nt. Bll.** See **Gen. Bll. I. Nt.**
- Gen. I. Nt. Mm.** Mémoires de l'Institut National Gènevois. Genève.
1854— B.M.; Camb.U.; Dub.R.D.S.; N.H.M.i.; Oxon.B.; R.S.; S.K.i.
- Gen. Mm. S. Ps.** Mémoires de la Société de Physique et d'Histoire Naturelle de Genève. Genève.
1821— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.S.; Glasg.U.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.i.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.; R.S.; U.C.L.i.
- See **Gen. S. Ps. Mm.**
- Genova Mm. I. Ligure**... Memorie dell'Istituto Ligure. Genova.
1806. B.M.; Camb.U.; R.S.
- Genova Mm. S. Md.**..... Memorie della Società Medica di Emulazione di Genova. Genova.
1802—04. R.C.Surg.
- Genova S. Lig. At.**..... Atti della Società Ligustica di Scienze Naturali e Geografiche. Genova.
1890— B.M.; N.H.M.; R.S.
- See **Gen. Mm. S. Ps.**
- Gergonne A. Mth.** Annales de Mathématiques, pures et appliquées; Gergonne. Nîmes, Paris.
1810—31. B.M.; Dub.T.C.; Edinb.U.i.; Glasg.U.i.; Oxon.B.(R.); R.A.S.i.; R.S.; U.C.L.
- Gg. J.**..... The Geographical Journal. Including the Proceedings of the Royal Geographical Society. London.
1893— [Continuation of: Proceedings, etc., 1857—92.] B.M.i.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.U.; I.CE.; Linn.S.; M.O.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Gg. Jb.** Geographisches Jahrbuch. Gotha.
1866— B.M.; Camb.U.; Edinb.U.i.; M.O.i.; N.H.M.i.; Oxon.B.; Oxon.R.; R.Geogr.S.; S.K.
- Gg. S. J.** Journal of the Royal Geographical Society of London. London.
1832—80. B.M.; Camb.P.S.i.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.; Linn.S.; M.O.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.Geogr.S.; R.S.; S.K.
- Gg. S. P.** Proceedings of the Royal Geographical Society of London. London.
1857—92. [Continued as: The Geographical Journal, 1893—] Camb.P.S.i.; Camb.U.; Dub.T.C.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.; Linn.S.; M.O.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.A.S.i.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Giessen Oberh. Gs. B.** ... Berichte der Oberhessischen Gesellschaft für Natur- und Heilkunde. Giessen.
1847— B.M.i.; Camb.P.S.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; P.O.i.; R.Geogr.S.i.; R.S.i.; S.K.
- Gilbert A.**..... Annalen der Physik; Gilbert. Halle und Leipzig.
1799—1824. [Continued as: Annalen der Physik und Chemie, 1824—] Camb.U.; Chem.S.; Edinb.U.; Glasg.U.i.; N.H.M.; Oxon.B.(R.); P.O.; R.C.Surg.; R.S.; S.K.
- Gill Tech. Mcr. Rep.**..... Gill's Technological [and Microscopic] Repository. London.
1827—30. [Continuation of: The Technical Repository, 1822—27.] B.M.; Camb.U.i.; Edinb.R.S.; Glasg.P.S.i.; I.CE.; Oxon.B.; P.O.
- Gill Tech. Rep.** The Technical Repository; Gill. London.
1822—27. [Continued as: Gill's Technological [and Microscopic] Repository, 1827—30.] B.M.; Camb.U.; Edinb.R.S.i.; Glasg.U.i.; I.CE.i.; Oxon.B.; P.O.; R.S.; S.K.
- Glasg. I. Eng. T.**..... Transactions of the Institution of Engineers [and Shipbuilders] in Scotland. Glasgow.
1857— Camb.U.i.; Glasg.U.; I.CE.; P.O.; U.C.L.i.
- See **Glasg. T. I. Eng.**
- Glasg. Md. J.** Glasgow Medical Journal. Glasgow.

List of Serial Publications

- 1828—32; 1854— B.M.; Camb.U.; Dub.T.C.; Edinb.U.i.;
Glasg.U.; Oxon.B.i.; Oxon.R.i.; Pharm.S.i.; R.C.Surg.;
U.C.L.i.
- Glasg. Ph. S. P.** Proceedings of the [Royal] Philosophical Society of Glasgow. Glasgow.
Glasg. P. Ph. S. 1841— B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.;
Edinb.R.S.; Geol.M.i.; Geol.S.i.; Glasg.P.S.; Glasg.U.i.; I.CE.i.;
N.H.M.; Oxon.B.; Pharm.S.i.; P.O.i.; R.A.S.; R.Geogr.S.i.;
R.S.; S.K.; U.C.L.i.
- Glasg. T. I. Eng.** See **Glasg. I. Eng. T.**
Gleanings Sc. Gleanings in Science. Calcutta.
1829—31. B.M.; Edinb.R.S.i.; I.CE.; M.O.i.; N.H.M.; S.K.;
U.C.L.i.
- Gl. Mg.** The Geological Magazine or Monthly Journal of Geology. London.
1864— B.M.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Geol.M.;
Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.; Linn.S.; N.H.M.; Oxon.R.;
P.O.i.; R.Geogr.S.; S.K.; U.C.L.
- Gl. S. P.** Proceedings of the Geological Society of London. London.
1826—45. [Continued in: The Quarterly Journal, etc., 1845—]
B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.;
Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.;
I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.A.S.; R.C.Surg.;
R.Geogr.S.; R.S.; S.K.; U.C.L.
- Gl. S. QJ.** The Quarterly Journal of the Geological Society of London. London.
1845— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.;
Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.;
Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.; R.C.Surg.;
R.Geogr.S.; R.S.; S.K.; U.C.L.
- Gl. Sv. Mm.** Memoirs of the Geological Survey of Great Britain and of the
Museum of Economic Geology in London. London.
1846— Camb.U.; Dub.R.C.S.; Dub.T.C.; Edinb.R.S.; Edinb.U.;
Geol.M.; Geol.S.; Glasg.U.i.; I.CE.; N.H.M.; Oxon.B.; Oxon.R.;
P.O.; R.S.; S.K.; U.C.L.
- G. Mt.** See **Mm. Gl. Sv.**
Giornale di Matematiche ad uso degli Studenti delle Università
Italiane; Battaglini. Napoli.
1863— B.M.; Camb.U.; Dub.R.C.S.i.; Dub.R.I.A.i.; Math.S.i.;
Oxon.B.; R.S.; U.C.L.i.
- Görl. Ab.** Abhandlungen der Naturforschenden Gesellschaft zu Görlitz. Görlitz.
1827— B.M.; Camb.U.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; N.H.M.;
R.S.; S.K.
- Götheb. Hndl.** Götheborgs Kongl. Vetenskaps och Vitterhets Samhälles Handlingar.
Götheborg.
1850— B.M.; Camb.P.S.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.
R.S.i.; N.H.M.; R.S.i.
- Götheb. N. Hndl.** Nya Handlingar af Kongl. Vetenskaps och Vitterhets Samhället i
Götheborg. Götheborg.
1808—22. Edinb.R.S.i.; Glasg.P.S.i.; R.S.
- Gött. Ab.** Abhandlungen der k. Gesellschaft der Wissenschaften. Göttingen.
1838— [Continuation of: Commentationes, etc., 1778—1837.] B.M.;
Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Glasg.U.;
Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.i.; R.S.; U.C.L.i.
- Gött. Cm.** Commentationes Societatis Regiæ Scientiarum Gottingensis. Got-
tingen.
1778—1808. B.M.i.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.
U.i.; N.H.M.; Oxon.B.; R.C.Surg.; R.S.; U.C.L.
Commentationes recentiores Societatis, etc. Göttingen.
1808—37. [Continued as: Abhandlungen, etc., 1838—] B.M.;
Camb.U.; Edinb.R.S.i.; Glasg.U.i.; N.H.M.; Oxon.B.; Oxon.R.;
R.A.S.i.; R.C.Surg.; R.S.; U.C.L.
- Gött. Nr.** Nachrichten von der k. Gesellschaft der Wissenschaften und der
Georg-Augusts-Universität zu Göttingen. Göttingen.
1845— B.M.*Camb.P.S.; Camb.U.i.; Dub.R.D.S.i.; Dub.R.I.A.i.;
Dub.T.C.i.; Edinb.R.S.; Glasg.U.i.; Linn.S.; Math.S.i.; N.H.M.;
Oxon.B.; Oxon.R.; R.A.S.i.; R.C.Surg.i.; R.S.
- Gött. Stud. Vr.** Studien des Göttingischen Vereins Bergmännischer Freunde;
Gött. Vr. Stud. Haussmann. Göttingen.
1824—58. Geol.S.i.; R.S.; S.K.

List of Serial Publications

- Gould As. J.**..... The Astronomical Journal; Gould. Cambridge, Mass.
1851—61. B.M.; Camb.U.; Glasg.U.i.; Oxon.B.; Oxon.R.i.;
R.A.S.; R.S.; S.K.
See As. J.
- Gratz Mt. NW. Vr. Steierm.**..... Mittheilungen des Naturwissenschaftlichen Vereins für Steiermark.
Gratz.
1863— B.M.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.;
Linn.S.i.; M.O.i.; N.H.M.; R.S.; U.C.L.i.
See Steierm. Mt.
- Graub. Nf. Gs. Jbr.**..... Jahres-Bericht der Naturforschenden Gesellschaft Graubünden's.
Chur.
1854— B.M.i.; Camb.U.i.; Glasg.P.S.i.; N.H.M.; R.S.i.
- 's Gravenh. I. Ing. Ts. ...** Tijdschrift van het Koninklijk Instituut van Ingenieurs. 's Graven-
hage.
1870— [Continuation of: Verhandelingen, etc., 1848—69.] B.M.;
I.CE.i.; P.O.
- 's Gravenh. I. Ing. Vh. ..** Verhandelingen van het Koninklijk Instituut van Ingenieurs.
's Gravenhage.
1848—69. [Continued as: Tijdschrift, etc. 1870—] B.M.; I.CE.i.;
P.O.
- Graz I. Pl. Us.**..... Untersuchungen aus dem Institute für Physiologie und Histologie in
Graz. Leipzig.
1870—73. B.M.i.; Glasg.P.S.i.; N.H.M.i.; R.C.Surg.i.; R.S.i.
- Grenoble Ac. Delph. Bil.** Bulletin de l'Académie Delphinale, ou Société des Sciences et Arts
de Grenoble. Grenoble.
1846— B.M.; Camb.U.i.; Oxon.B.; R.S.i.
- Gruithuisen N. Analekt.** Neue Analekten für Erd- und Himmelskunde. Gruithuisen.
München.
1832—36. B.M.; R.A.S.; R.S.
- Grunert Arch.** Archiv der Mathematik und Physik; Grunert. Greifswald,
Leipzig.
1841— B.M.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Edinb.U.;
Glasg.U.; Math.S.i.; Oxon.B.(R.); R.S.; U.C.L.i.
See Arch. Mth. Ps.
- Grunert Met. Opt.** Beiträge zur Meteorologischen Optik, etc.; Grunert. Leipzig.
1848—50. B.M.; Camb.U.; Glasg.P.S.i.; M.O.; R.A.S.
- G. Teix. J. Sc.** Jornal de Sciencias Mathematicas e Astronomicas, publicado pelo
Dr Francisco Gomes Teixeira. Coimbra.
1878— Math.S.; R.S.i.
- Guy's Hosp. Rp.**..... Guy's Hospital Reports. London.
1836— Camb.U.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; Oxon.B.(R.);
R.C.Surg.; R.S.; U.C.L.i.
- Gz. C. It.** Gazzetta Chimica Italiana. Palermo.
1871— B.M.; Camb.P.S.i.; Camb.U.; Chem.S.; Edinb.U.; P.O.;
R.S.i.; S.K.
- Haarl. Ms. Teyl. Arch.**.... Archives du Musée Teyler. Haarlem.
1866— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.;
Glasg.P.S.; N.H.M.; Oxon.R.; R.A.S.; R.S.; S.K.
See Harl. Arch. Ms. Teyl.
- Haarl. Ntk. Vh.** Natuurkundige Verhandelingen van de [Bataafsche] Hollandsche
Maatschappij der Wetenschappen te Haarlem. Haarlem.
- Haarl. Ntk. Vh. Mtsch.**..... { 1799— B.M.; Camb.U.i.; Dub.R.D.S.; Geol.S.i.; Glasg.U.i.;
N.H.M.; R.S.; S.K.i.
- Haarl. Vh.**..... {
- Habana Ac. A.** Anales de la Real Academia de Ciencias Medicas, Fisicas y Naturales
de la Habana. Revista Cientifica. Habana.
1864— N.H.M.
- Haidinger Ab.**..... Naturwissenschaftliche Abhandlungen; Haidinger. Wien.
1847—51. Camb.U.; Chem.S.i.; Edinb.R.S.i.; Geol.S.; Linn.S.;
N.H.M.; R.A.S.i.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.
- Haidinger B.** Berichte über die Mittheilungen von Freunden der Naturwissen-
schaften in Wien; Haidinger. Wien.
1847—51. Camb.U.; Chem.S.i.; Edinb.R.S.; Geol.S.i.; Linn.S.;
N.H.M.; R.A.S.; R.Geogr.S.; R.S.
- Hain. Mm. S.** Mémoires et Publications de la Société des Sciences, des Arts et des
Lettres du Hainaut. Mons.
- Hain. S. Mm.** { 1839— B.M.; Dub.T.C.i.; N.H.M.; Oxon.B.i.; R.S.i.; S.K.

List of Serial Publications

- Hall Bij.** Bijdragen tot de Natuurkundige Wetenschappen; Hall, etc. Amsterdam.
1826—32. B.M.; Camb.U.; N.H.M.; R.S.; S.K.
- Halle Ab. Nf. Gs.** Abhandlungen der Naturforschenden Gesellschaft zu Halle. Halle.
1853— B.M.; Camb.U.; Edinb.R.S.i.; Glasg.P.S.i.; N.H.M.; Oxon.B.; R.C.Surg.i.; R.S.; S.K.
See Halle Nf. Gs. Ab.
- Halle Jbr. Nf. Gs.** Jahresbericht der Naturforschenden Gesellschaft zu Halle. Halle.
1823—25. Glasg.P.S.i.; R.S.
- Halle Jbr. NW. Vr.** Jahresbericht des Naturwissenschaftlichen Vereins für Sachsen und Thüringen in Halle. Berlin.
1848—52. [Continued as: Zeitschrift für die gesammten Naturwissenschaften, 1853—] Edinb.R.S.; Geol.S.i.; Glasg.P.S.i.; N.H.M.; Oxon.R.i.; R.S.; S.K.i.
- Halle Nf. Gs. Ab.** *See Halle Ab. Nf. Gs.*
- Halle Nf. Gs. B.** Bericht über die Sitzungen der Naturforschenden Gesellschaft zu Halle. Halle.
1853—92. B.M.; Camb.U.i.; Edinb.R.S.i.; Glasg.P.S.i.; R.C.Surg.i.; R.S.i.
See Halle Sb. Nf. Gs.
- Halle Nf. Gs. Festschr.** Festschrift.....der Naturforschenden Gesellschaft zu Halle. Halle.
1879. Glasg.P.S.i.; N.H.M.; Oxon.B.; R.S.; S.K.
- Halle Sb. Nf. Gs.** *See Halle Nf. Gs. B.*
- Halle Z.** Zeitschrift für die gesammten Naturwissenschaften; herausgegeben von dem Naturwissenschaftlichen Vereine für Sachsen und Thüringen in Halle; Giebel. Berlin.
1853— [Continuation of: Jahresbericht des Naturwissenschaftlichen Vereins, 1848—52.] B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.S.; S.K.
See Z. Nw.
- Hamb. Mth. Gs. Mt.** Mittheilungen der Mathematischen Gesellschaft in Hamburg. Leipzig.
1889— Math.S.
- Hamb. Nt. Vr. Ab.** Abhandlungen aus dem Gebiete der Naturwissenschaften, herausg. vom Naturwissensch. Verein von Hamburg-Altona. Hamburg.
1846— Camb.U.; Edinb.R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; R.S.; S.K.
- Hamb. Nt. Vr. Vh.** Verhandlungen des Naturwissenschaftlichen Vereins von Hamburg-Altona. Hamburg.
1877—81; 1894— Dub.R.I.A.i.; Linn.S.i.; N.H.M.; R.S.
- Hamb. Ws. Anst. Jb.** Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten. Hamburg.
1884— Camb.U.; Edinb.R.S.; Linn.S.; N.H.M.; S.K.
- Hann. A.** Hannöversche Annalen für die gesammte Heilkunde. Hannover.
1836—46. B.M.; Glasg.P.S.i.; R.C.Surg.
- Hann. Archt.-Vr. Z.** Zeitschrift des Architekten- und Ingenieur-Vereins zu Hannover. Hannover.
1855— Camb.U.i.; I.CE.; P.O.
- Harl. Arch. Ms. Teyl.** *See Haarl. Ms. Teyl. Arch.*
- Harv. As. Obs. A.** Annals of the Astronomical Observatory of Harvard College. Cambridge, Mass.
1856— B.M.; Camb.P.S.; Camb.U.i.; Edinb.R.S.i.; Glasg.U.i.; M.O.i.; Oxon.B.; P.O.i.; R.A.S.; R.S.; S.K.i.; U.C.L.i.
- Hedw.** Hedwigia: Notizblatt für kryptogamische Studien, nebst Repertorium für kryptog. Literatur. Dresden.
1852— B.M.; Camb.U.i.; Dub.N.L.I.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.; N.H.M.
- Heidl. Nt. Md. Vh.** Verhandlungen des Naturhistorisch-Medicinischen Vereins zu Heidelberg. Heidelberg.
1857— Camb.U.i.; Chem.S.i.; Dub.R.I.A.; Geol.S.; Linn.S.i.; N.H.M.i.; R.S.i.
- Heidl. Vh. Nt. Md.** *See Heidl. Nt. Md. Vh.*
- Helsingf. Acta.** Acta Societatis Scientiarum Fennicæ. Helsingfors.
1842— B.M.; Camb.P.S.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.i.; Glasg.U.i.; N.H.M.; Oxon.B.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.
- Helsingf. Öfv.** Öfversigt af Finska Vetenskaps-Societetens Förhandlingar. Helsingfors.

List of Serial Publications

- 1853— B.M.; Camb.P.S.i.; Camb.U.i.; Dub.R.D.S.; Dub.R.I.A.;
Edinb.R.S.i.; Glasg.U.i.; M.O.i.; N.H.M.; Oxon.B.; R.A.S.;
R.Geogr.S.i.; R.S.
- Henle u. Pfeufer Z.** Zeitschrift für rationelle Medicin; Henle und Pfeufer. Zürich,
Heidelberg, Leipzig.
- 1844—69. B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Oxon.R.;
R.C.Surg.; R.S.; U.C.L.
- Hermbstädt Bll.** Bulletin des Neuesten und Wissenswürdigsten aus der Naturwissen-
schaft, etc.; Hermbstädt. Berlin.
- 1809—13. [Continued as: Museum des Neuesten, etc., 1814—18.]
B.M.; Camb.U.; R.S.
- Hermbstädt Ms.** Museum des Neuesten und Wissenswürdigsten aus dem Gebiete der
Naturwissenschaft, der Künste, der Fabriken, der Manufakturen,
der technischen Gewerbe, der Landwirthschaft, der Produkten-
waaren und Handelskunde, und der bürgerlichen Haushaltung,
etc.; Hermbstädt. Berlin.
- 1814—18. [Continuation of: Bulletin des Neuesten, etc., 1809—13.]
B.M.; Camb.U.; R.S.
- Hermst. Vh.** Verhandlungen und Mittheilungen des Siebenbürgischen Vereins
für Naturwissenschaften. Hermannstadt.
- 1850— B.M.; Camb.U.; Dub.R.I.A.i.; N.H.M.; R.S.; S.K.
- Herts. NH. S. T.** Transactions of the Hertfordshire Natural History Society and Field
Club. London, Watford, Hertford.
- 1880— [Continuation of: Transactions. of the Watford Natural
History Society and Hertfordshire Field Club, 1875—79.] B.M.;
Camb.U.; Dub.R.I.A.i.; Geol.M.; Geol.S.; Glasg.P.S.; Linn.S.;
N.H.M.; Oxon.B.; R.S.; U.C.L.
- Hisinger Afh.** { Afhandlingar i Fysik, Kemi, och Mineralogie; Hisinger och
Hisinger Afh. Fys. { Berzelius. Stockholm.
- 1806—18. Glasg.P.S.i.; Glasg.U.i.; N.H.M.; R.C.Surg.; R.S.; S.K.
- Hoeven en Vriese Ts.** Tijdschrift voor Natuurlijke Geschiedenis en Physiologie; Hoeven
en Vriese. Amsterdam.
- 1834—45. B.M.; Camb.U.; N.H.M.
- Holländ. Mg.** Holländisches Magazin der Naturkunde. Frankfurt-am-Main.
- 1802—05. Glasg.P.S.i.; R.S.
- Hufeland J. Arzn.** Journal der practischen Arzneykunde [und Wundarzneykunst];
Hufeland, etc. Jena.
- 1795—1844. B.M.; Glasg.P.S.i.; R.C.Surg.
- Humb.** Humboldt. Monatschrift für die gesammten Naturwissenschaften.
Stuttgart.
- 1882—90. B.M.; Glasg.P.S.i.; P.O.; S.K.
- I. CE. P.** Minutes of Proceedings of the Institution of Civil Engineers, con-
taining Abstracts of the Papers and of the Discussions. London.
- 1837— B.M.; Camb.P.S.; Camb.U.; Dub.R.C.S.; Dub.R.D.S.;
Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.i.;
Glasg.U.; I.CE.; Oxon.B.; Oxon.R.i.; P.O.; R.Geogr.S.; R.S.;
S.K.; U.C.L.
- See **CE. I. P.**
- I. Égypt. Bll.** Bulletin de l'Institut Egyptien. Le Caire.
- 1859— Camb.P.S.i.; Camb.U.i.; N.H.M.; R.Geogr.S.i.; U.C.L.i.
- Iékat. S. Our. Bll.** Bulletin de la Société Ouralienne d'Amateurs des Sciences Naturelles.
Ekaterinburg.
- 1874— Edinb.R.S.i.; Geol.S.i.; N.H.M.i.
- I. Elect. E. J.** Journal of the Institution of Electrical Engineers, late the Society
of Telegraph Engineers and Electricians. London.
- 1890— [Continuation of: Journal of the Society of Telegraph
Engineers and Electricians, 1872—89.] B.M.; Camb.P.S.i.;
Camb.U.; Dub.T.C.i.; Edinb.R.S.i.; Glasg.U.i.; I.CE.; Oxon.B.;
Oxon.R.; P.O.; R.S.; S.K.; U.C.L.
- I. Gl. Sv. Mm.** Memoirs of the Geological Survey of India. Calcutta.
- 1859— B.M.; Camb.P.S.; Camb.U.i.; Dub.N.L.I.; Dub.R.C.S.;
Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.U.;
I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.C.Surg.;
R.Geogr.S.; R.S.; U.C.L.i.
- Il Cim.** Il Cimento, Rivista di Scienze, Lettere, ed Arti. Torino.
- 1852—55. B.M.

List of Serial Publications

- Il Polit.** Il Politecnico; Repertorio mensile di Studj applicati alla Prosperità e Coltura sociale.
1839—44; 1860—65.
Il Politecnico; Repertorio di Studj letterarj, scientifici e tecnici. Milano.
1866— B.M.i.; I.CE.i.; P.O.
- Il Progresso** Il Progresso delle Scienze, Lettere, ed Arti. Napoli.
First series undated; Second series 1832—64. Camb.U.; Oxon.B.
- Il Tempo** Il Tempo, Giornale Italiano di Medicina, etc. Firenze.
1858—60. B.M.; Glasg.P.S.i.
- I. ME. P.** Institution of Mechanical Engineers. Proceedings. Birmingham, London.
1847— B.M.; Camb.P.S.i.; Camb.U.; Dub.R.D.S.; Glasg.P.S.; Glasg.U.; I.CE.; Oxon.B.i.; P.O.; R.S.; S.K.i.; U.C.L.
- I. Mn. E. T.** See **ME. I. P.**
Transactions of the Institution of Mining Engineers. Newcastle-upon-Tyne.
1898— [Continuation of: Transactions of the Federated Institution of Mining Engineers, 1889—98.] Camb.U.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.; Oxon.B.; P.O.; S.K.
- Ing.** Der Ingenieur; Zeitschrift für das gesammte Ingenieurwesen; Bornemann, Freiberg.
1848—50. B.M.; I.CE.; P.O.
- Inghirami Opusc.** Nuova Collezione di Opuscoli e Notizie di Scienze; Inghirami. Fiesole.
1820—23. B.M.
- Innsb. Ferd. Z.** Zeitschrift des Ferdinandeums für Tirol und Vorarlberg. Innsbruck.
1852— B.M.; N.H.M.; R.S.
- Innsb. Nt. Md. B.** Berichte des Naturwissenschaftlich-Medizinischen Vereins in Innsbruck. Innsbruck.
1870— B.M.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Linn.S.i.; N.H.M.; Oxon.R.; R.S.
- Intell. Obs.** The Intellectual Observer; a Review of Natural History, Microscopic Research, and Recreative Science. London.
1862—68. [Continuation of: Recreative Science, 1859—62.] [Continued as: The Student and Intellectual Observer, 1868—71.] B.M.; Camb.U.; Geol.S.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.; R.S.i.; S.K.
- Int. Md. Cg. T.** { Comptes-Rendus [Atti, Verhandlungen, Transactions] du Congrès International de Médecine. Paris, etc.
- Int. Md. Cg. Vh.** { 1867— B.M.; Camb.U.i.; Glasg.P.S.i.; Oxon.R.; R.C.Surg.
See **Cg. Int. Md. C. R. and Cg. Md. Int. At.**
- Iowa Ac. Sc. P.** Proceedings of the Iowa Academy of Sciences. Des Moines.
1875— B.M.i.; Edinb.R.S.i.; N.H.M.; Oxon.B.i.; P.O.; R.S.i.; U.C.L.i.
- Ir. Ac. P.** Proceedings of the Royal Irish Academy. (Science.) Dublin.
1836— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.; Linn.S.; Math.S.i.; M.O.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.i.; R.A.S.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- Ir. Ac. T.** Transactions of the Royal Irish Academy. Science. Dublin.
1787— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.; Glasg.U.i.; I.CE.; Linn.S.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.i.; R.A.S.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.
- Ir. Gl. S. J.** Journal of the Royal Geological Society of Ireland. London, Dublin, Edinburgh.
1864—87. [Continuation of: Journal of the Geological Society of Dublin, 1833—64.] B.M.; Camb.U.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.M.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; R.C.Surg.; R.Geogr.S.i.; R.S.
- Ir. Natlist.** The Irish Naturalist: A Monthly Journal of General Irish Natural History. Dublin, Belfast, London.
1892— B.M.; Camb.P.S.i.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Dub.T.C.; Geol.M.i.; Geol.S.; Linn.S.; N.H.M.; S.K.

List of Serial Publications

- Isère S. Bl.** Bulletin de la Société de Statistique, des Sciences Naturelles, et des Arts Industriels du département de l'Isère. Grenoble.
1838— B.M.i.; N.H.M.; Oxon.B.; R.S.i.
- I. & S. I. J.** The Journal of the Iron and Steel Institute. London.
1872— Camb.U.; Chem.S.i.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.;
Edinb.U.; Geol.M.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.i;
I.C.E.; Oxon.B.; P.O.; R.S.; S.K.; U.C.L.
- I. Solvay Tr.** Institut Solvay. Travaux de Laboratoire. Bruxelles.
1896— Glasg.P.S.i.; R.S.
- It. S. Gl. Bl.** Bollettino della Società Geologica Italiana. Rome.
1882— B.M.; Geol.M.; Geol.S.; Glasg.P.S.i.; N.H.M.; Oxon.R.
- It. S. Met. An.** Annuario Meteorologico Italiano pubblicato per cura del Comitato direttivo della Società Meteorologica Italiana. Torino, Roma, Firenze.
1886—92 B.M.; M.O.
- Jam. I. J.** Journal of the Institute of Jamaica. Kingston, Jamaica.
1891— B.M.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; N.H.M.;
R.Geogr.S.i.; R.S.; S.K.
- J. Anal. C.** The Journal of Analytical [and Applied] Chemistry. Easton, Pa.
1887—93. Chem.S.; P.O.i.
- J. An. Pl.** The Journal of Anatomy and Physiology, normal and pathological. London, Cambridge, Edinburgh.
1867— B.M.; Camb.P.S.; Camb.U.; Edinb.R.S.; Edinb.U.;
Glasg.P.S.; Glasg.U.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.;
R.C.Surg.; R.S.; S.K.; U.C.L.
- Jap. As. S. T.** Transactions of the Asiatic Society of Japan. Yokohama.
1872— B.M.; Camb.U.; Edinb.R.S.; N.H.M.; Oxon.B.; Oxon.R.;
P.O.i.; R.Geogr.S.i.; R.S.
- Jap. Seism. S. T.** Transactions of the Seismological Society of Japan. Yokohama.
1880—92. [*Continued as:* Seismological Journal of Japan, 1893—95.]
Camb.U.; Dub.R.I.A.; Edinb.R.S.; Geol.M.; Glasg.U.i.; I.C.E.i;
N.H.M.i.; R.A.S.i.; R.Geogr.S.; R.S.i.; U.C.L.i.
- Jb. Berg- Hm.** Berg- und Hüttenmännisches Jahrbuch der k.k. Schemnitz-
Bergakademie und der k.k. Montan-Lehranstalten zu Leoben und
Pöfgram. Wien.
1851— B.M.i.; Geol.S.i.; I.C.E.i.; P.O.i.; S.K.
*See Berg- Hm. Jb., Leoben Berg- Hm. Jb., and Wien Berg-
Hm. Jb.*
- Jb. Berg- Hw.** Jahrbuch für das Berg- und Hüttenwesen im Königreiche Sachsen.
Freiberg.
1873— [*Continuation of:* Jahrbuch für den Berg- und Hüttenmann,
1837—72.] B.M.; Geol.S.; I.C.E.; N.H.M.i.; P.O.; S.K.
- Jb. Mijnw. Ned. Ind.** Jaarboek van het Mijnwezen in Nederlandsch Oost-Indië. Amsterdam.
1872— B.M.; Geol.S.; Glasg.P.S.i.; I.C.E.; N.H.M.; P.O.; S.K.i.
- J. Bt.** The Journal of Botany, British and Foreign. London.
1863— B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.C.S.; Glasg.U.;
Linn.S.; N.H.M.; Oxon.B.; Pharm.S.; P.O.i.; R.C.Surg.i;
R.S.i.; S.K.i.
- J. C. Méd.** Journal de Chimie Médicale, de Pharmacie, et de Toxicologie.
Paris.
1825—76. B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i;
Oxon.B.(R.); Pharm.S.i.; R.C.Surg.i.; R.S.i.
- J. de Ps.** Journal de Physique, de Chimie, et d'Histoire Naturelle; de
Lamétherie, etc. Paris.
1794—1823. B.M.; Camb.U.; Geol.S.; Glasg.U.i.; N.H.M.i.;
Oxon.B.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
- J. de Ps.** Journal de Physique Théorique et Appliquée; d'Almeida. Paris.
1872— Camb.P.S.i.; Camb.U.; Dub.R.C.S.; Glasg.U.i.; I.C.E.i;
Oxon.R.; P.O.; R.S.; S.K.
- Jena. Sb.** Sitzungsberichte der Jenaischen Gesellschaft für Medicin und
Naturwissenschaft. Jena.
1877—86. Edinb.R.S.i.; Linn.S.i.; Oxon.R.; R.S.; S.K.
- Jena. Z.** Jenaische Zeitschrift für Naturwissenschaft, herausg. von der
Medicinisch-Naturwissenschaftlichen Gesellschaft zu Jena.
Jena.
1864— B.M.; Camb.P.S.i.; Camb.U.; Chem.S.i.; Dub.N.L.I.i;

List of Serial Publications

- Dub.R.D.S.i.; Edinb.R.S.; Edinb.U.i.; Glasg.U.i.; Linn.S.;
N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Jern-Kont. A.** Jern-Kontoret's Annaler. En Tidskrift för Svenska Bergshand-
teringen. Stockholm.
1817— B.M.; I.CE.i.; P.O.; R.S.i.; S.K.
- J. Gén. Civ.** Journal du Génie Civil des Sciences et des Arts. Paris.
1828—48. B.M.i.; Camb.U.; P.O.
- J. H. Un. Cir.** The Johns Hopkins University Circulars. Baltimore.
1879— Camb.P.S.; Camb.U.; Dub.N.L.I.i.; Dub.R.I.A.i.;
Edinb.R.S.i.; Edinb.U.; Glasg.P.S.; Glasg.U.i.; Math.S.i.;
N.H.M.; Oxon.B.; Oxon.R.; R.A.S.i.; R.Geogr.S.i.; R.S.;
S.K.; U.C.L.i.
- J. I. Archip.** Journal of the Indian Archipelago and Eastern Asia. Singapore.
1847—58. B.M.i.; Camb.U.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.i.;
N.H.M.; P.O.; R.Geogr.S.; R.S.; S.K.i.
- J. Lndw.** Journal für Landwirthschaft. Celle, Göttingen, Berlin.
1853— B.M.i.; P.O.i.
- J. Microgr.** Journal de Micrographie. Paris.
1877—92. Camb.U.; Glasg.P.S.i.; N.H.M.; Oxon.R.; P.O.i.
- J. Micr. Sc.** Quarterly Journal of Microscopical Science; Lankester and Busk.
London.
1853— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.;
Dub.R.C.S.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.;
Glasg.U.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; Pharm.S.;
P.O.; R.C.Surg.; R.S.; S.K.; U.C.L.
See Micr. J. and QJ. Micr. Sc.
- J. Méd. Chir. Phm.** Journal de Médecine, Chirurgie, Pharmacie, etc... Paris.
1801—17. [*Continued as:* Nouveau Journal de Médecine, etc.
1818—22.] Edinb.U.i.; R.C.Surg.; R.S.
- J. Mines** Journal des Mines, ou Recueil de Mémoires sur l'exploitation des
Mines, et sur les Sciences et les Arts qui s'y rapportent. Paris.
1794—1815. [*Continued as:* Annales des Mines, 1817—] B.M.;
Camb.U.; Dub.T.C.; Edinb.R.S.; Geol.S.; I.CE.; Linn.S.i.;
N.H.M.; Oxon.B.(R.); R.S.i.; S.K.
- J. Phm.** Journal de Pharmacie et des Sciences accessoires. Paris.
1815—41. [*Continuation of:* Bulletin de Pharmacie, 1809—14.]
[*Continued as:* Journal de Pharmacie et de Chimie, 1842—]
Camb.U.; Chem.S.; Edinb.R.S.i.; Edinb.U.; Glasg.U.; Oxon.B.;
Pharm.S.; P.O.; R.C.Surg.; R.S.i.; U.C.L.i.
- J. Pl. Pth. Gén.** Journal de Physiologie et de Pathologie Générale. Paris.
1899— [*Continuation of:* Archives de Physiologie, etc., 1868—
98.] B.M.; Edinb.U.; Glasg.P.S.i.; Oxon.R.; R.C.Surg.; R.S.;
U.C.L.
- J. Pr. C.** Journal für praktische Chemie; Erdman, etc. Leipzig.
1834— [*Continuation of:* Journal für technische und ökonomische
Chemie, 1828—33.] B.M.; Camb.U.; Chem.S.; Dub.N.L.I.i.;
Dub.R.C.S.i.; Dub.R.D.S.i.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.;
N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.;
S.K.; U.C.L.i.
See Erdm. J. Pr. C.
- J. Ps. C.** The Journal of Physical Chemistry. Ithaca, N.Y.
1896— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Edinb.R.S.;
Edinb.U.; Glasg.U.; Oxon.R.; P.O.; R.S.i.; S.K.
- J. Sav.** Journal des Savants. Paris.
1816— B.M.; Camb.U.; Dub.N.L.I.; Dub.T.C.; Edinb.R.S.i.;
Glasg.U.; Oxon.B.; Oxon.R.; P.O.i.; R.S.
- J. Sc.** The Journal of Science and Annals of Astronomy, Biology, Geology,
Industrial Arts, Manufactures and Technology. London.
1879—85. [*Continuation of:* The Quarterly Journal of Science,
1864—78.] B.M.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Edinb.R.S.;
Edinb.U.i.; Glasg.U.i.; I.CE.; Linn.S.i.; N.H.M.; Oxon.R.;
Pharm.S.i.; P.O.; R.A.S.i.; R.C.Surg.i.; R.S.; S.K.
- J. Tél.** Journal Télégraphique publié par le Bureau International des
Administrations Télégraphiques. Berne.
1869— P.O.
- Kan. Ac. Sc. T.** Transactions of the Kansas Academy of Science. Topeka, Kansas.

List of Serial Publications

- 1872— Camb.P.S.i.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.i.;
Glasg.P.S.i.; Linn.S.i.; N.H.M.; Oxon.B.i.; R.S.i.; U.C.L.i.
The Kansas University Quarterly. Laurence, Kansas.
1893— B.M.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Geol.
S.i.; Glasg.P.S.i.; Math.S.i.; N.H.M.; R.S.
- Karlsruhe Nt. Vr. Vh.** ... Verhandlungen des Naturwissenschaftlichen Vereins in Karlsruhe.
Karlsruhe.
1864— B.M.i.; Dub.R.I.A.; Geol.S.i.; N.H.M.
See **Karlsruhe Vh. Nw. Vr.**
- Kärnten Landms. Jb.** ... Jahrbuch des Naturhistorischen Landesmuseums von Kärnten.
Klagenfurt.
1852— Camb.U.; Geol.S.i.; Glasg.P.S.i.; N.H.M.; R.S.i.
- Karsten Arch.** ... Archiv für Mineralogie, Geognosie, Bergbau, und Hüttenkunde;
Karsten. Berlin.
1829—55. B.M.; Edinb.R.S.i.; Geol.M.; Geol.S.; N.H.M.; P.O.;
R.S.
- Karsten Arch. Bergbau** ... Archiv für Bergbau und Hüttenwesen; Karsten. Berlin, Breslau.
1818—31. N.H.M.; P.O.; R.S.; S.K.
- Kassel Vr. Nt. Ab. u. B.** ... Abhandlungen u. Bericht...des Vereins für Naturkunde zu Kassel.
Kassel.
1894—98. [Continuation of: Bericht, etc., 1837—94.] Edinb.R.S.i.;
Glasg.P.S.i.; N.H.M.
- Kassel Vr. Nt. B.** ... Bericht des Vereines für Naturkunde zu Kassel. Kassel.
1837—94. [Continued as: Abhandlungen u. Bericht, etc. 1894—98.]
Edinb.R.S.i.; Glasg.P.S.i.; N.H.M.; R.S.i.
- Kassel Vr. Nt. Festschr.** ... Festschrift des Vereins für Naturkunde zu Cassel zur Feier seines
fünfzigjährigen Bestehens. Cassel.
1886. N.H.M.
- Kastner Arch. C.** ... Archiv für Chemie und Meteorologie; Kastner. Nürnberg.
1830—35. Edinb.R.S.; M.O.i.; N.H.M.; P.O.; R.S.
- Kastner Arch. Ntl.** ... Archiv für die gesammte Naturlehre; Kastner. Nürnberg.
1824—35. B.M.; N.H.M.; P.O.; R.C.Surg.i.; S.K.
- Kazan Mm. Un.** ... Scientific Memoirs published by the Imperial University of Kazan.
[In Russian.] Kazan.
1834— B.M.i.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.i.;
Glasg.P.S.i.; Linn.S.i.; R.S.i.
See **Kazan Un. Mm.**
- Kazan S. Nt. (Ps.-Mth.) P.** ... Proceedings of the Physico-Mathematical Section of the Naturalists'
Society of the Imperial University of Kazan. [In Russian.] Kazan.
1883—90. [Continued as: Bulletin de la Société Physico-Mathé-
matique de Kasan, 1891—] R.S.
- Kazan S. Nt. T.** ... Transactions of the Naturalists' Society of the Imperial University
of Kazan. [In Russian.] Kazan.
1871— B.M.; Glasg.P.S.i.; N.H.M.
- Kazan S. Ps.-Mth. Bll.** ... Bulletin de la Société Physico-Mathématique de Kasan. [In Russian.]
Kasan.
1891— [Continuation of: Proceedings of the Physico-Mathematical
Section of the Naturalists' Society of the Imperial University of
Kazan, 1883—90.] Dub.R.I.A.i.; Edinb.R.S.i.; R.S.i.
- Kazan Un. Mm.** ... See **Kazan Mm. Un.**
- Kharkov Mth. S. Com.** ... Communications and Proceedings of the Mathematical Society of
the Imperial University of Kharkov. [In Russian.] Kharkov.
1879— R.S.i.
- Kiel Schr.** ... Schriften der Universität zu Kiel. Kiel.
1855—80. B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; N.H.M.i.;
Oxon.B.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.i.
- Kiev S. Nt. Mm.** ... Memoirs of the Kiev Naturalists' Society. [In Russian.] Kiev.
1870— B.M.; Camb.P.S.i.; Dub.R.I.A.i.; Glasg.P.S.i.; N.H.M.;
R.Geogr.S.i.; R.S.i.
- Kjøb. Bt. F. Mdd.** ... Meddelelser fra den Botaniske Forening i Kjøbenhavn. Kjøbenhavn.
1882—91. Linn.S.
- Kjøb. Carlsb. Lb. Mdd.** ... Meddelelser fra Carlsberg Laboratoriet. Kjøbenhavn.
1876— B.M.; Chem.S.; Glasg.P.S.i.; N.H.M.; P.O.; R.S.
- Kiøb. Dn. Vd. Selsk. Afh.** ... Det Kongelige Danske Videnskabernes Selskabs naturvidenskabelige
og matematiske Afhandlinger. Kiøbenhavn.
1824—46. B.M.; Dub.T.C.; Edinb.R.S.; Geol.S.i.; Linn.S.i.;
N.H.M.; R.S.; S.K.

List of Serial Publications

- Kjöb. Dn. Vd. Selsk. Skr.** { Det Kongelige Danske Videnskabernes Selskabs Skrifter. Kjöbenhavn. 1801—18. B.M.; Camb.P.S.i.; Camb.U.; Edinb.R.S.; N.H.M.; Oxon.B.; R.S.
Kjöb. Dn. Vd. Selsk. Skr. { See **Dn. Vd. Selsk. Skr.**
- Kjöb. Dn. Vd. Selsk. Skr.** { Det Kongelige Danske Videnskabernes Selskabs Skrifter. Natur-
Kjöb. Skr. { videnskabelig og Mathematisk Afdeling. Kjöbenhavn.
Kjöb. Skr. { 1849— B.M.; Camb.U.i.; Edinb.R.S.; Linn.S.; N.H.M.; R.A.S.;
R.Geogr.S.; R.S.; U.C.L.i.
- Kjöb. Ov.** { Oversigt over det Kongelige Danske Videnskabernes Selskabs For-
Kjöb. Ov. { handlinger. Kjöbenhavn.
Kjöb. Ov. { 1806— Camb.P.S.; Camb.U.i.; Chem.S.i.; Dub.R.D.S.i.; Dub.
R.I.A.i.; Dub.T.C.i.; Edinb.R.S.i.; Geol.S.i.; Glasg.U.i.; Linn.
S.i.; M.O.i.; N.H.M.i.; Oxon.R.; P.O.i.; R.A.S.i.; R.Geogr.S.i.;
R.S.; S.K.i.; U.C.L.i.
- Kolozsvár Orv.-Term.** { Értésítő a "Kolozsvári Orvos-Természettudományi Társulat" -nak
Társ. Éts. { az...orvosi, természettudományi szaküléseiről... [Proceedings
of the medical and natural history sections of the Klausenburg
Medical and Natural History Society.] Kolozsvár [Klausenburg].
1876—79. N.H.M.
- Königsb. Nw. Unterh.** { Königsberger Naturwissenschaftliche Unterhaltungen. Königsberg.
1842—46. Camb.U.; Glasg.P.S.i.; R.S.
- Königsb. SB.** { Schriften der königlichen Physikalisch-Oekonomischen Gesellschaft
zu Königsberg. Königsberg.
Königsb. Schr. { 1860— B.M.; Camb.P.S.; Dub.R.I.A.; Edinb.R.S.i.; Linn.S.;
N.H.M.; P.O.i.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.
- Kosmos (Lw.)** { Kosmos. Czasopismo polskiego Towarzystwa przyrodników imienia
Kopernika. [Cosmos. The Journal of the Polish Society of
Naturalists founded in honour of Copernicus.] Lwow.
1876— B.M.; N.H.M.
- Krk. Ak. (Mt.-Prz.) Pam.** { Pamiętnik Akademii Umiejętności w Krakowie. Wydział Mate-
matyczno-Przyrodniczy. [Memoirs of the Academy of Science in
Cracow. Section of Mathematics and Natural Science.] Kraków.
1874— B.M.; Edinb.R.S.i.; Glasg.U.i.; N.H.M.
- Krk. Ak. (Mt.-Prz.) Rz.** { Rozprawy... Wydziału Matematyczno-Przyrodniczego Akademii
Krk. Ak. (Mt.-Prz.) Rz. { Umiejętności. [Proceedings of the Section of Mathematics and
& Sp. { Natural Science of the Academy of Science.] Kraków.
1874— B.M.; Camb.U.i.; Edinb.R.S.i.; Geol.S.i.; Glasg.U.i.;
N.H.M.
- Krk. Roczn. Tow. Nauk.** { Rocznik Towarzystwa Naukowego z Uniwersytetem Krakowskim
Krk. Roczn. Uniwers. { Połączanego. Krakowie. [Annals of the Scientific Society of the
Polish University of Krakow. Krakow.]
1817—72. B.M.; Glasg.U.i.
- Lamont A. Met.** { Annalen für Meteorologie, Erdmagnetismus, und verwandte Gegen-
stände; Lamont. München.
1842—44. Camb.U.; Glasg.P.S.i.; M.O.; R.S.; S.K.
- Lamont Jb. Sternw.** { Jahrbuch der K. Sternwarte bei München; Lamont. München.
Münch. { 1838—41. B.M.; Camb.U.; R.A.S.; R.S.
- Lanc. Hist. S. T.** { Proceedings and Papers of the Lancashire and Cheshire Historic
Lanc. T. Hist. S. { Society. Liverpool.
1849—54. [Continued as: Transactions, etc., 1855—] B.M.;
Camb.U.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Geol.S.i.; Glasg.P.S.i.;
Glasg.U.i.; Oxon.B.i.; R.Geogr.S.i.; R.S.
- Laus. Bil. S. Vd.** { Bulletin des Séances de la Société Vaudoise des Sciences Naturelles.
Lausanne.
1842— Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Geol.S.;
Linn.S.; N.H.M.; Oxon.B.i.; R.C.Surg.i.; R.S.; S.K.i.
See **Laus. S. Vd. Bil.**
- Laus. C. R. S. Suisse** { Comptes Rendus de la Société Suisse. Lausanne.
1861. Glasg.P.S.i.; N.H.M.; R.S.
- Lausitz. Mschr.** { Lausitzische [und neue Lausitzische] Monatsschrift. Organ der
Oberlausitzischen Gesellschaft der Wissenschaften. Görlitz.
1800—08. B.M.
- Laus. S. Vd. Bil.** { See **Laus. Bil. S. Vd.**
- Lb.** { The Laboratory, a Weekly Record of Scientific Research.
London.
1867. B.M.; Chem.S.; Oxon.R.; Pharm.S.; P.O.; R.S.

List of Serial Publications

- Leic. S. T.** The Transactions of the Leicester Literary and Philosophical Society. Leicester.
1835— Camb.U.; Dub.R.D.S.; Geol.S.; Glasg.P.S.; Linn.S.i.; M.O.i.; N.H.M.i.; Oxon.B.; P.O.; S.K.; U.C.L.
- Leijd. A. Ac.** Annales Academiæ Lugduno-Batavæ. Leijden.
1815—75. B.M.; Camb.U.; Dub.T.C.i.; N.H.M.; Oxon.B.; R.C.Surg.i.; R.S.i.; U.C.L.i.
- Leip. Ab. Jablon. Gs.** Abhandlungen bei Begründung der k. Sächsischen Gesellschaft der Wissenschaften am Tage der zweihundertjährigen Geburtsfeier Leibnizens; herausg. v. d. Jablonowski'schen Gesellschaft zu Leipzig. Leipzig.
1846. Camb.U.; Dub.R.I.A.; Edinb.R.S.; N.H.M.; R.A.S.; R.S.; S.K.
- Leip. Ab. Mth. Ps.** Abhandlungen der Mathematisch-Physischen Classe der Königlich Sächsischen Gesellschaft der Wissenschaften. Leipzig.
1852— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Glasg.U.; Math.S.i.; N.H.M.; Oxon.B.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.i.
See Leip. Mth. Ps. Ab.
- Leip. Arb. Pl. Anst.** Arbeiten aus der Physiologischen Anstalt zu Leipzig. Leipzig.
1866—76. Camb.U.; Glasg.P.S.i.; Oxon.R.; R.C.Surg.; R.S.
- Leip. As. Gs. Vjschr.** Vierteljahrsschrift der Astronomischen Gesellschaft. Leipzig.
1866— B.M.; Camb.P.S.i.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Oxon.R.; R.A.S.; R.S.; S.K.
- Leip. B.** Berichte über die Verhandlungen (Math.-Phys. Classe) der Königlich Sächsischen Gesellschaft der Wissenschaften zu Leipzig. Leipzig.
1846— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Glasg.U.; Math.S.i.; N.H.M.; Oxon.B.; Oxon.R.; R.A.S.; R.S.; S.K.i.; U.C.L.i.
See Leip. Mth. Ps. B.
- Leip. Jablon. Preisschr.** Preisschriften gekrönt und herausgegeben von der Fürstlich Jablonowski'schen Gesellschaft zu Leipzig. Leipzig.
1847— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; N.H.M.; Oxon.B.; R.A.S.i.; R.S.i.; U.C.L.i.
- Leip. Mth. Ps. Ab.** *See Leip. Ab. Mth. Ps.*
- Leip. Mth. Ps. B.** *See Leip. B.*
- Leip. Nf. Gs. Sb.** Sitzungsberichte der Naturforschenden Gesellschaft zu Leipzig. Leipzig.
1875— B.M.; Camb.U.; Edinb.R.S.i.; N.H.M.; R.C.Surg.; R.S.i.; S.K.
- L. Electr. S. P.** Proceedings of the London Electrical Society. London.
1841—43. [Continuation of: Transactions and Proceedings, 1837—40.] B.M.; Camb.U.; Chem.S.; Geol.S.; Glasg.P.S.i.; I.CE.; Oxon.B.; P.O.; R.S.; S.K.
- Leoben Berg- Hm. Jb.** Berg- und Hüttenmännisches Jahrbuch der k.k. Schemnitz-Bergakademie und der k. k. Montan-Lehranstalten zu Leoben und Pöfgram. Wien.
1851— B.M.i.; Geol.S.i.; I.CE.i.; P.O.i.; S.K.
See Berg- Hm. Jb., Jb. Berg- Hm., and Wien Berg- Hm. Jb.
- Leonhard u. Bronn N. Jb.** Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde; Leonhard und Bronn. Stuttgart.
1833—62. [Continuation of: Jahrbuch für Mineralogie, etc., 1830—32.] [Continued as: Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, 1863—] B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.D.S.i.; Geol.M.; Geol.S.; Glasg.U.; I.CE.i.; N.H.M.; Oxon.R.; R.S.; S.K.i.
- Le Puy A. S. Ag.** Annales de la Société d'Agriculture, Sciences, etc., du Puy. Le Puy.
- Le Puy S. Ag. A.** [1826— Geol.S.i.; N.H.M.]
- Les Mondes** Les Mondes, Revue hebdomadaire des Sciences et de leurs Applications aux Arts et à l'Industrie; l'Abbé F. Moigno. Paris.
1863—84. B.M.; Camb.U.i.; Dub.N.L.I.i.; Glasg.P.S.i.; I.CE.i.; M.O.i.; Oxon.R.; P.O.; R.S.i.; S.K.i.
- L'I** L'Institut; Journal des Académies et Sociétés Scientifiques de la France et de l'Étranger. Paris.
1833—76. B.M.i.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; Geol.S.i;

List of Serial Publications

- Glasg.P.S.i.; N.H.M.i.; Oxon.B.(R.); P.O.i.; R.C.Surg.i.; R.S.i.; S.K.i.
- Lick Obs. Ct.** Contributions from the Lick Observatory. Sacramento. 1889—95. B.M.i.; Edinb.R.S.; R.A.S.
- Lieb. A.** Annalen der Chemie und Pharmacie; Liebig, etc. Lemgo, Leipzig, Heidelberg. 1832— B.M.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Dub.R.C.S.i.; Edinb.R.S.i.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
- See **A. C. Phm.**
- Liège A. Ac.** Annales Academiæ Leodiensis. Liège. 1817—27. B.M.; Camb.U.; Dub.T.C.; N.H.M.; Oxon.B.; R.S.
- Liège Lb. Fred. Tr.** Université de Liège. Institut de Physiologie. Travaux du Laboratoire de Léon Fredericq. Paris, Liège. 1886— Edinb.R.i.; Glasg.P.S.i.; R.S.
- Liège Mm. S. Sc.** Mémoires de la Société [Royale] des Sciences, de l'Agriculture, et des Arts à Liège. Liège. 1843— B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.i.; N.H.M.; Oxon.B.; P.O.; R.S.; S.K.
- See **Liège S. Sc. Mm.**
- Liège S. Gl. Belg. A.** Annales de la Société Géologique de Belgique. Liège. 1874— Camb.P.S.; Geol.M.; Geol.S.; I.CE.i.; N.H.M.; R.S.; S.K.i.
- See **Liège Mm. S. Sc.**
- Lille Mm.** Mémoires de la Société [Royale] des Sciences, etc. à Lille. Lille. 1827—96. B.M.; Camb.U.; Dub.T.C.; N.H.M.; Oxon.B.; Oxon.R.; R.S.i.
- See **Lille S. Mm.**
- Lille Sé. Pbl.** Séances Publiques de la Société des Amateurs. Lille. 1806—19. [Continued as: Recueil des Travaux, etc., 1819—27.] B.M.; Glasg.P.S.i.; N.H.M.; Oxon.R.
- See **Lille Mm.**
- Lille S. Mm.** Recueil des Travaux de la Société d'Amateurs des Sciences, de l'Agriculture, et des Arts à Lille. Lille. 1819—27. [Continuation of: Séances Publiques, etc., 1806—19.] B.M.; Camb.U.; Dub.T.C.; N.H.M.; Oxon.B.; Oxon.R.; R.S.
- Lille Tr.** Travaux et Mémoires de l'Université de Lille. Lille. 1889— Camb.P.S.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; N.H.M.; R.S.; S.K.i.
- Lindenau Z.** Zeitschrift für Astronomie und verwandte Wissenschaften; Lindenau. Tübingen. 1816—18. B.M.; Camb.U.; R.A.S.; R.S.
- Linnaea** Linnaea; ein Journal für die Botanik in ihrem ganzen Umfange. Berlin. 1826—82. B.M.; Camb.U.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.; N.H.M.; R.S.
- Liouv. J.** Journal de Mathématiques pures et appliquées, fondé par Joseph Liouville. Paris. 1836— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; I.CE.i.; Oxon.B.(R.); R.S.; S.K.; U.C.L.
- Lisb. Ac. Sc. Mm.** Historia e Memorias da Academia Real das Sciencias de Lisboa. Lisboa. 1797— B.M.; Camb.U.; Edinb.R.S.; Geol.S.i.; N.H.M.; Oxon.B.; R.A.S.; R.C.Surg.i.; R.Geogr.S.i.; R.S.i.; S.K.i.
- See **Lisb. Mm. Ac. Sc.**
- Lisb. Act.** Actas das Sessões da Academia Real das Sciencias de Lisboa. Lisboa. 1849—51. B.M.; Dub.R.I.A.; Dub.T.C.; Glasg.P.S.i.; N.H.M.; R.S.
- Lisb. A. Mar.** Annaes maritimos e coloniaes. Lisboa. 1840—45. N.H.M.; Oxon.B.i.; R.Geogr.S.i.
- Lisb. J. Sc. Mth.** Jornal de Sciencias mathematicas, physicas e naturaes. Publicado sob os auspicios da Academia R. das Sciencias de Lisboa. Lisboa. 1868— B.M.; Camb.U.; Dub.R.D.S.i.; Edinb.R.S.i.; Geol.S.; Linn.S.; Math.S.i.; N.H.M.; Oxon.B.; R.A.S.; R.Geogr.S.; R.S.; U.C.L.i.

List of Serial Publications

- Lisb. Mm. Ac. Sc.** See **Lisb. Ac. Sc. Mm.**
L. Md. Ps. J. The Medical and Physical Journal. London.
 1799—1833. B.M.; Camb.U.i.; Chem.S.i.; Edinb.U.; Oxon.B.;
 Oxon.R.; Pharm.S.i.; R.C.Surg.
- L. Mth. S. P.** Proceedings of the London Mathematical Society. London.
 1865— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.;
 Edinb.R.S.; Edinb.U.; Glasg.U.; Math.S.; Oxon.B.i.; Oxon.R.;
 R.S.; S.K.; U.C.L.
- Lndw. Jb.** Landwirthschaftliche Jahrbücher. Berlin.
 1872— [Continuation of: Annalen der Landwirthschaft, 1843—71.]
 B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Linn.S.i.; Oxon.B.;
 P.O.; R.S.; S.K.
- Lndw. V.-St.** Die landwirthschaftlichen Versuchs-Stationen. Organ für wissen-
 schaftliche Forschungen auf dem Gebiete der Landwirthschaft.
 Dresden, Chemnitz.
 1859— B.M.i.; Camb.U.; Chem.S.i.; Glasg.U.i.; Oxon.B.; P.O.i.;
 R.S.i.
- See **Dresden Lndw. V.-St.**
 Transactions of the Odontological Society. London.
 1856— B.M.; Camb.U.; Geol.S.i.; Glasg.P.S.i.; Oxon.B.;
 Pharm.S.i.; R.C.Surg.; R.S.; U.C.L.i.
- Lotos** Lotos. Zeitschrift für Naturwissenschaften. Prag.
 1851—95. B.M.; Camb.U.; Dub.R.I.A.i.; N.H.M.
- Louvain A. Ac.** Annales Academiæ Lovaniensis. Bruxelles, Louvain.
 1821—27. B.M.; Camb.U.; Dub.T.C.; Oxon.B.; R.S.
- Lpldina** Leopoldina: amtliches Organ der Kaiserlichen Leopoldino-
 Carolinischen Deutschen Akademie der Naturforscher. Dres-
 den, Halle.
 1859— B.M.; Camb.P.S.; Camb.U.i.; Edinb.R.S.i.; Linn.S.;
 M.O.i.; N.H.M.; R.A.S.i.; R.S.
- L. Pol. Mg.** Polytechnic Magazine and Journal of Science, Literature and the
 Fine Arts. London.
 1844. [Continued as: The London Polytechnic Review and Maga-
 zine, 1845.] B.M.; Camb.U.; Edinb.U.
- Lpool. Bl. S. P. & T.** Proceedings and Transactions of the Liverpool Biological Society.
 Liverpool.
 1890— [Continuation of: Proceedings, 1887—89.] Camb.U.i.;
 Dub.R.D.S.; Edinb.R.S.; Linn.S.; N.H.M.; Oxon.B.i.; S.K.
- Lpool. Lt. Ph. S. P.** Proceedings of the Literary and Philosophical Society of Liverpool.
 London, Liverpool.
 1844— B.M.; Camb.U.i.; Chem.S.i.; Dub.R.I.A.; Edinb.R.S.i.;
 Geol.S.; Glasg.P.S.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.i.;
 P.O.i.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- Lpool. Md. Chir. J.** Liverpool Medico-Chirurgical Journal. Liverpool.
 1857—59. B.M.; Camb.U.; Dub.T.C.; Oxon.B.; R.C.Surg.
- L. Ps. S. P.** Proceedings of the Physical Society of London. London.
 1874— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.C.S.; Dub.
 R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.i.; Geol.S.i.;
 Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Math.S.; Oxon.B.; Oxon.R.;
 P.O.; R.A.S.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
- Lucca At. Ac.** Atti della R. Accademia Lucchese di Scienze, Lettere ed Arti. Lucca.
 1821— B.M.; Camb.U.; Dub.T.C.i.; Oxon.B.i.
- Lum. Élect.** La Lumière Electrique. Journal universel d'Electricité. Paris.
 1879—94. B.M.; Glasg.U.i.; I.CE.; P.O.; S.K.i.
- Lund. Acta Un.** Acta Universitatis Lundensis. Lunds Universitets Års-skrift.
 Afdelningen för Matematik och Naturvetenskap. Lund.
 1864— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.;
 Geol.S.i.; Glasg.U.i.; Linn.S.i.; N.H.M.; Oxon.B.; R.S.; S.K.i.
- See **Lund. Un. Acta.**
Lund Phys. Sällsk. Årsb. Physiographiska Sällskapets Årsberättelse. Lund.
 1823—24. R.S.i.
- Lund Phys. Sällsk. Ts...** Physiografiska Sällskapets Tidskrift. Lund.
 1837—38. Camb.U.; N.H.M.; R.S.
- Lund. Un. Acta** See **Lund. Acta Un.**
- Lüneb. Nt. Vr. Jh.** Jahreshefte des Naturwissenschaftlichen Vereins für das Fürstenthum
 Lüneberg. Lüneberg.
 1865— N.H.M.

List of Serial Publications

- Lux. I. Pb.** Publications de l'Institut Royal Grand-Ducal de Luxembourg.
Lux. Pb. I. Section des Sciences Naturelles et Mathématiques: ci-devant
 "Société des Sciences Naturelles." Luxembourg.
 1870— Dub. R.D.S.; Dub. R.I.A.; Edinb. R.S.i.; N.H.M.;
 R.S.i.
- Lux. S. Sc. Mm.** Société des Sciences Naturelles du Grand-Duché de Luxembourg.
Lux. S. Sc. Nt. Luxembourg.
 1853—69. Dub. R.I.A.; R.S.
- Lyon Ac. Mm.** Mémoires de l'Académie des Sciences, Belles-Lettres et Arts de
 Lyon. Classe des Sciences. Lyon, Paris.
Lyon Ac. Mm. (Sc.) 1845— B.M.; Camb. U.; Edinb. R.S.i.; Linn. S.i.; N.H.M.; Oxon. B.;
 R.S.i.; S.K.i.
Lyon Ac. Sc. Mm. See **Lyon Mm. Ac.**
- Lyon A. S. L.** Annales de la Société Linnéenne de Lyon. Lyon.
 1836— B.M.; Camb. U.i.; Dub. R.I.A.; Edinb. R.S.i.; Linn. S.i.;
 N.H.M.; Oxon. B.i.(R.); R.S.i.; S.K.i.
- Lyon Mm. Ac.** } See **Lyon Ac. Mm.**
Lyon Mm. Ac. Sc. }
Lyon S. Ag. A. Annales des Sciences physiques et naturelles, d'Agriculture et
 d'Industrie, publiées par la Société d'Agriculture, etc.
 1838—67.
 Annales de la Société d'Agriculture, Histoire Naturelle et Arts
 Utiles de Lyon. Lyon.
 1868— B.M.; Camb. U.; Dub. R.I.A.; Linn. S.; N.H.M.; Oxon. B.;
 P.O.; R.S.; S.K.i.
- Lyon S. Sc. Md. Mm.** ... Mémoires et Comptes-Rendus de la Société des Sciences Médicales
 de Lyon. Lyon, Paris.
 1862— Glasg. P.S.i.; R.C. Surg.i.
- Lyon Un. A.** Annales de l'Université de Lyon. Paris, Lyon.
 1891— B.M.; Edinb. R.S.; N.H.M.i.; R.S.i.
- Mâcon Ac. A.** Annales de l'Académie de Mâcon, Société des Arts, Sciences, Belles-
 Lettres et d'Agriculture. Mâcon.
 1851— B.M.; R.S.i.
- Mâcon S. Ag. C. R.** } Compte Rendu des Travaux de la Société (d'Agriculture,) des
Mâcon S. C. R. } Sciences, Arts et Belles-Lettres de Mâcon. Mâcon.
 1807—52. B.M.i.; R.S.i.
- Madras Eng. Rp.** Reports, etc. on various professional subjects connected with the
 duties of the Corps of Engineers of the Madras Presidency;
 Capt. J. T. Smith, F.R.S. Madras.
 1839—46. I.C.E.; P.O.; R.S.
- Madras J.** The Madras Journal of Literature and Science. Madras.
 1833— B.M.i.; Camb. U.; Dub. N.L.I.i.; Geol. S.i.; Linn. S.i.;
 N.H.M.; Oxon. B.i.; P.O.; R.A.S.i.; R.Geogr. S.i.; R.S.i.;
 S.K.i.; U.C.L.i.
- Madrid Ac. Ci. Mm.** Memorias de la Real Academia de Ciencias. Madrid.
 1850— B.M.; Camb. U.i.; Dub. R.I.A.; Dub. T.C.; Edinb. R.S.;
 Geol. S.i.; Linn. S.i.; N.H.M.; Oxon. B.; R.A.S.i.; R.C. Surg.i.;
 R.Geogr. S.i.; R.S.i.; S.K.i.; U.C.L.i.
- Madrid A. H. Nt.** See **Madrid Mm.**
 Anales de Historia Natural. Madrid.
 1799—1804. B.M.; N.H.M.; R.S.
- Madrid Mm.** See **Madrid Ac. Ci. Mm.**
- Madrid Rv.** Revista de los Progresos de las Ciencias exactas, físicas, y naturales.
 Madrid.
 1850—86. B.M.; Dub. R.D.S.i.; Edinb. R.S.i.; Geol. S.i.; N.H.M.;
 Oxon. R.i.; R.A.S.i.; R.S.i.
- Madrid S. H. Nt. A.** Anales de la Sociedad Española de Historia Natural. Madrid.
 1872— Camb. U.; Glasg. P.S.i.; N.H.M.; R.S.
- Mag. Ak. Éts.** Magyar Akadémiai Értesítő. [Report of the Hungarian Academy.]
 Pest.
 1840—59. B.M.
- Mag. Ak. Éts. (Mth. Term.)** Magyar Akadémiai Értesítő. A matematikai és természettudo-
 mányi osztályok közlönye. [Report of the Hungarian Academy.
 Communications of the Mathematical and Natural Science
 sections.] Pest.
 1860—65. B.M.; Camb. P.S.i.; Geol. S.i.; R.Geogr. S.i.; R.S.; S.K.i.

List of Serial Publications

- Magdeb. Nt. Vr. Jbr. u. Ab.** Jahresbericht und Abhandlungen des Naturwissenschaftlichen Vereins zu Magdeburg. Magdeburg. 1869— B.M.; R.S.i.
- Magendie J. de Pl.** Journal de Physiologie, expérimentale et pathologique; Magendie. Paris. 1821—31. Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.i.; R.C.Surg.; R.S.; U.C.L.
- Mag. Tud. Ak. Étk. (Mth.)** Értekezések a Mathematikai Osztály köréből. Kiadja a Magyar Tudományos Akadémia. [Memoirs on Mathematical subjects. Published by the Hungarian Academy of Science.] Pest. 1867—94. B.M.; Edinb.R.S.i.; Geol.S.i.; R.S.; S.K.i.
- Mag. Tud. Ak. Étk. (Termt.)** Értekezések a Természettudományok köréből. Kiadja a Magyar Tudományos Akadémia. [Memoirs on Natural Science subjects. Published by the Hungarian Academy of Science.] Pest. 1867—94. B.M.; Edinb.R.S.i.; Geol.S.i.; Glasg.P.S.i.; N.H.M.; R.Geogr.S.i.; R.S.; S.K.i.
- Mag. Tud. Ak. Éts.** A Magyar Tudományos Akadémia Értesítője. [Report of the Hungarian Academy of Science.] Pest. 1867— B.M.; R.Geogr.S.i.; R.S.i.; S.K.i.
- Mag. Tud. Ak. Évk.** A Magyar Tudós Társaság' Evkönyvei. Pest. 1833—46.
A Magyar Tudományos Akadémia Évkönyvei. Budá. 1860—89. B.M.; Edinb.R.S.i.; Geol.S.i.; N.H.M.; Oxon.B.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
See Évk.
- Majocchi A. Fis. C.** Annali di Fisica, Chimica, e Matematiche, col Bulletino dell' Industria meccanica e chimica; Majocchi. Milano. 1841—50. B.M.; R.S.
- Malpighia** Rassegna mensile di Botanica. Messina, Genova. 1886— B.M.; Camb.U.; Linn.S.; N.H.M.
- Manch. Gl. S. T.** Transactions of the Manchester Geological Society. London. 1841— B.M.; Camb.U.i.; Dub.T.C.; Edinb.R.S.i.; Geol.M.; Geol.S.; I.CE.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.S.; U.C.L.
- Manch. Lt. Ph. S. Mm.** Memoirs of the Literary and Philosophical Society of Manchester. London, Manchester. 1785—1887. [Continued as: Memoirs and Proceedings, etc., 1888—] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.; Dub.R.I.A.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.; Linn.S.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
See Manch. Mm. Ph. S. and Manch. S. Mm.
- Manch. Lt. Ph. S. Mm. & P.** Memoirs and Proceedings of the Manchester Literary and Philosophical Society. Manchester. 1888— [Continuation of: Memoirs, etc., 1785—1887, and Proceedings, etc., 1857—87.] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.P.S.; Glasg.U.; I.CE.; Linn.S.; Math.S.; M.O.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.; P.O.; R.A.S.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Manch. Lt. Ph. S. P.** Proceedings of the Literary and Philosophical Society of Manchester. Manchester. 1857—87. [Continued as: Memoirs and Proceedings, etc., 1888—] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.; Linn.S.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.; Pharm.S.; P.O.; R.A.S.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
See Manch. Ph. S. P. and Manch. S. P.
- Manch. Mcr. S. Rp.** Manchester Microscopical Society. Annual Report. Manchester. 1880—84. [Continued as: Transactions, etc., 1884—] Edinb.R.S.i.; Glasg.P.S.i.; N.H.M.i.; P.O.; S.K.i.
- Manch. Mcr. S. T.** Manchester Microscopical Society. Transactions and Annual Report. Manchester. 1884— [Continuation of: Reports, 1880—84.] B.M.i.; Camb.U.i.; Edinb.R.S.i.; Linn.S.i.; N.H.M.; P.O.; S.K.i.
- Manch. Mm. Ph. S.** } *See Manch. Lt. Ph. S. Mm.*
- Manch. Ph. S. Mm.** }
- Manch. Ph. S. P.** } *See Manch. Lt. Ph. S. P.*
- Manch. S. Mm.** } *See Manch. Lt. Ph. S. Mm.*

List of Serial Publications

- Manch. S. P.** *See Manch. Lt. Ph. S. P.*
Marb. Schr. Schriften der Gesellschaft zur Beförderung der gesammten Naturwissenschaften zu Marburg. Marburg.
 1823— B.M.i.; Camb.U.; N.H.M.; Oxon.R.; R.S.i.; S.K.i.
Marseille Mm. S. Ém. ... Mémoires de la Société d'Émulation de la Provence. Marseille.
 1861—66. B.M.; Glasg.P.S.i.; N.H.M.
Mars. Fac. Sc. A. Annales de la Faculté des Sciences de Marseille. Marseille, Paris.
 1891— B.M.; Camb.P.S.; Dub.R.I.A.; Edinb.R.S.; Glasg.P.S.; Linn.S.; Math.S.i.; N.H.M.; R.A.S.; R.S.
Maryland Ac. T. Transactions of the Maryland Academy of Sciences and Letters. Baltimore.
 1837. Glasg.P.S.i.; R.S.
Maryland Gl. Sv. Maryland Geological Survey. Baltimore.
 1897— Camb.P.S.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.i.; N.H.M.; P.O.; R.Geogr.S.; R.S.; U.C.L.
Mathesis Mathesis. Recueil Mathématique.... Gand, Paris.
 1881— B.M.; Camb.U.
Mbl. Nt. Maandblad voor Natuurwetenschappen, uitgegeven door de Sectie voor Natuurwetenschappen van het Genootschap ter Bevordering van Natuur-, Genees- en Heelkunde. Amsterdam.
 1871— N.H.M.
Mcr. J. Quarterly Journal of Microscopical Science; Lankester and Busk. London.
 1853— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.; Dub.R.C.S.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; Pharm.S.; P.O.; R.C.Surg.; R.S.; S.K.; U.C.L.
See J. Mcr. Sc. and QJ. Mcr. Sc.
Mcr. S. J. Journal of the Royal Microscopical Society. London.
 1878— [Continuation of: The Monthly Microscopical Journal, 1869—77.] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.C.Surg.; R.S.i.; S.K.; U.C.L.
Mcr. S. T. Transactions of the Microscopical Society of London. London.
 1844—68. [Continued as: The Monthly Microscopical Journal, 1869—77.] B.M.; Camb.U.i.; Edinb.R.S.i.; Geol.S.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.i.; Pharm.S.i.; P.O.; R.C.Surg.; R.S.; S.K.; U.C.L.
Md. Chir. S. P. Proceedings of the Royal Medical and Chirurgical Society of London. London.
 1857— B.M.; Camb.U.; Edinb.R.S.; Glasg.P.S.i.; Oxon.B.i.; Oxon.R.; Pharm.S.i.; R.C.Surg.; R.S.; U.C.L.
Md. Chir. T. Medico-Chirurgical Transactions, published by the [Royal] Medical and Chirurgical Society of London. London.
 1809— B.M.; Camb.U.; Dub.R.D.S.; Edinb.R.S.i.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.; Oxon.B.; Oxon.R.; Pharm.S.i.; R.C.Surg.; R.S.; U.C.L.
Md. C. Us. Medicinisch-chemische Untersuchungen: aus dem Laboratorium für angewandte Chemie zu Tübingen; Hoppe-Seyler. Berlin.
 1866—71. B.M.; Camb.U.; Chem.S.; Edinb.U.; R.C.Surg.; R.S.
Md. Jb. Medizinische Jahrbücher. Herausg. von der K. K. Gesellschaft der Aerzte in Wien. Wien.
 1861— [Continuation of: Zeitschrift der K. K. Gesellschaft, etc., 1844—60.] Camb.U.i.; Glasg.P.S.i.; Pharm.S.i.; R.C.Surg.
Meckel Arch. Archiv für Anatomie und Physiologie; Meckel. Leipzig.
 1826—32. [Continued as: Archiv für Anatomie, Physiologie, und Wissenschaftliche Medicin, 1834—76.] B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.; U.C.L.i.
Meckl. Vr. Nt. Arch. ... Archiv des Vereins der Freunde der Naturgeschichte in Mecklenburg. Neubrandenburg.
 1847— Camb.U.; Linn.S.i.; N.H.M.; R.S.i.
See Meckl. Arch.
Medley I. Eng. Professional Papers on Indian Engineering; Major J. G. Medley.
Medley Prof. Pp. I. Eng. { Roorkee.
 1864—86. I.CE.; P.O.i.; R.S.i.

List of Serial Publications

- ME. I. P.** Institution of Mechanical Engineers. Proceedings. Birmingham, London.
1847— B.M.; Camb.P.S.i.; Camb.U.; Dub.R.D.S.; Glasg.P.S.; Glasg.U.; I.CE.; Oxon.R.i.; P.O.; R.S.; S.K.i.; U.C.L.
See I. ME. P.
- Meisner A.** Annalen der allgemeinen Schweizerischen Gesellschaft für die gesammten Naturwissenschaften; Meisner. Bern.
1824—25. B.M.; Linn.S.; N.H.M.; R.S.
- Meisner Az.** Naturwissenschaftlicher Anzeiger der allgemeinen Schweizerischen Gesellschaft für die gesammten Naturwissenschaften; Meisner. Aarau, Bern.
1818—23. B.M.; Glasg.P.S.i.; N.H.M.
See Meckl. Vr. Nt. Arch.
- Meckl. Arch.** The Messenger of Mathematics. Cambridge, London.
1862— B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.i.; Dub.R.C.S.i.; Dub.R.D.S.i.; Edinb.R.S.i.; Edinb.U.; Glasg.U.; Math.S.i.; Oxon.B.; Oxon.R.; R.S.; S.K.; U.C.L.
- Metaxà A. Md. Chir.** ... Annali Medico-Chirurgici; Metaxà. Roma.
1839—46. B.M.; Glasg.P.S.i.; Oxon.B.
- M.-et-L. Mm. S. Ac.** Mémoires de la Société Académique de Maine et Loire. Angers.
1857—83. [*Continued as:* Mémoires de l'Académie des Sciences et Belles-Lettres d'Angers, 1890—95.] B.M.; Camb.U.; N.H.M.; R.S.i.
- M.-et-L. S. Ac. Mm.** Quarterly Journal of the [Royal] Meteorological Society. London.
1873— [*Continuation of:* Proceedings of the British Meteorological Society, 1861—71.] Camb.U.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Geol.S.; Glasg.U.; I.CE.; Linn.S.i.; M.O.; Oxon.R.; P.O.; R.A.S.; R.Geogr.S.i.; R.S.
- Met. S. QJ.** Meteorologische Zeitschrift. Berlin.
1884— Camb.U.; Edinb.R.S.; M.O.; P.O.; R.Geogr.S.; R.S.; S.K.
- Met. Z.** Mémoires de l'Académie Royale, Impériale de Metz. Metz.
1821— B.M.; Camb.U.; Dub.T.C.; N.H.M.; Oxon.B.; R.S.i.; S.K.
- Metz Ac. Mm.** Boletín del Instituto Nacional [de la Sociedad Mexicana] de Geografía y Estadística de la Republica Mexicana. México.
1850—66. B.M.; Oxon.B.i.; R.Geogr.S.i.
- Metz Mm. Ac.** Boletín de la Sociedad de Geografía y Estadística de la Republica Mexicana. México.
1869— B.M.; Edinb.R.S.i.; R.Geogr.S.i.
- Méx. Bl. Gg.** Ministerio de Fomento de la República Mexicana. Boletín mensual del Observatorio Meteorológico-Magnético central de México. México.
1888— Edinb.R.S.; Glasg.P.S.i.; M.O.
- Méx. Gg. Bl.** Memorias de la Sociedad Científica "Antonio Alzate." México.
1887— B.M.i.; Camb.P.S.; Dub.R.I.A.; Edinb.R.S.; Glasg.U.i.; Linn.S.i.; Math.S.i.; M.O.; N.H.M.i.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- Méx. Obs. Bl.** The Magazine of Natural History, and Journal of Zoology, Botany, Mineralogy, Geology, and Meteorology. London.
1829—40. [*Continued as:* Annals and Magazine of Natural History, 1841—] B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.i.; R.S.; U.C.L.i.
- Méx. S. "Alzate" Mm.** Magazin für Naturvidenskaberne; Lundh, etc. Christiania.
1823—36. [*Continued as:* Nyt Magazin, etc., 1838—] B.M.; N.H.M.i.; R.S.
- Mg. NH.** Magazin für die neuesten Erfahrungen, Entdeckungen und Berichtigungen im Gebiete der Pharmacie, etc. Karlsruhe, Heidelberg.
1823—24. [*Continued as:* Magazin für Pharmacie und die dahin einschlagenden Wissenschaften, 1824—31.] Glasg.P.S.i.; R.C. Surg.; R.S.
- Mg. Ntvd.** Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. Gesammelte Abhandlungen aus den Sitzungsberichten der K. Akademie der Wissenschaften. Wien.
1880— Camb.U.i.; Chem.S.; Glasg.P.S.i.; Glasg.U.i.; Pharm.S.; P.O.
- Mg. Phm.** Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. Gesammelte Abhandlungen aus den Sitzungsberichten der K. Akademie der Wissenschaften. Wien.
1880— Camb.U.i.; Chem.S.; Glasg.P.S.i.; Glasg.U.i.; Pharm.S.; P.O.
- Mh. C.** Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. Gesammelte Abhandlungen aus den Sitzungsberichten der K. Akademie der Wissenschaften. Wien.
1880— Camb.U.i.; Chem.S.; Glasg.P.S.i.; Glasg.U.i.; Pharm.S.; P.O.

List of Serial Publications

- Mh. Mth. Ps.** Monatshefte für Mathematik und Physik. Wien.
1890— B.M.; Camb.U.; Edinb.U.; Math.S.i.; N.H.M.
- Midl. Ntlist.** The Midland Naturalist. London, Birmingham.
1878—93. Camb.U.; Geol.M.; Geol.S.i.; Linn.S.; N.H.M.; P.O.; S.K.
- Mil. At. Aten.** Atti dell' Ateneo, già Accademia fisico-medico-statistica di Milano.
Milano.
1859—67. Glasg.P.S.i.
- Mil. At. Cagnola** Atti della Fondazione Scientifica Cagnola dalla sua Istituzione in
poi. Milano.
1856— B.M.; Glasg.P.S.i.; N.H.M.i.; R.S.i.; S.K.i.
- Mil. At. I. Lomb.** Atti dell' I. R. Istituto Lombardo di Scienze, Lettere ed Arti.
Milano.
1858—64. [Continuation of: Giornale, etc., 1841—56.] [Continued
as: Rendiconti, etc., 1864—] B.M.; Camb.U.; Dub.R.I.A.;
Edinb.R.S.; I.CE.i.; N.H.M.; Oxon.B.; R.Geogr.S.i.; R.S.
- Mil. At. S. It.** Atti della Società Italiana di Scienze Naturali. Milano.
1855— B.M.; Camb.U.; Edinb.R.S.i.; N.H.M.; P.O.i.; R.S.; S.K.i.
See **Mil. S. It. At.**
- Mil. Effem.** Effemeridi Astronomiche di Milano. Con Appendice di Osservazioni
e Memorie Astronomiche. Milano.
- Mil. Effem. As.** 1806— Camb.U.; Oxon.B.; R.A.S.i.
- Mil. G. I. Lomb.** Giornale dell' I. R. Istituto Lombardo di Scienze, Lettere ed Arti
e Biblioteca Italiana; compilata da varj dotti nazionali e stranieri.
Milano.
1841—56. [Continued as: Atti, etc., 1858—64.] B.M.; Geol.S.i.;
I.CE.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.
See **Mil. I. Lomb. G.**
- Mil. G. S. Inc.** Giornale della Società d' Incoraggiamento delle Scienze, etc. stabilità
in Milano. Milano.
1808—65. B.M.; Camb.U.
- Mil. I. Lomb. G.** See **Mil. G. I. Lomb.**
- Mil. I. Lomb. Mm.** Memorie dell' I. R. Istituto Lombardo di Scienze, etc. Milano.
1843— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.;
Edinb.R.S.i.; Geol.S.; I.CE.i.; Math.S.i.; N.H.M.; Oxon.B.;
R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- Mil. I. Lomb. Rd.** See **Mil. Mm. I. Lomb.**
- Reale Istituto Lombardo di Scienze e Lettere. Rendiconti. Milano.
1864— [Continuation: of Atti, etc., 1858—64.] B.M.; Camb.P.S.;
Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.;
Glasg.U.i.; I.CE.i.; Math.S.i.; N.H.M.; Oxon.B.i.; R.A.S.i.;
R.Geogr.S.; R.S.; S.K.i.; U.C.L.i.
- Mil. Mm. I. Lomb.** See **Mil. I. Lomb. Mm.**
- Mil. Mm. I. Lomb. Ven.** Memorie dell' I. R. Istituto del regno Lombardo-Veneto. Milano.
1819—38. B.M.; Camb.U.; I.CE.; N.H.M.; Oxon.B.i.; R.C.Surg.i.;
R.Geogr.S.; R.S.; S.K.
- Mil. S. It. At.** See **Mil. At. S. It.**
- Minn. Ac. Sc. Bll.** Bulletin of the Minnesota Academy of Natural Sciences. Minneapolis,
Minn.
1874— B.M.; Geol.S.i.; N.H.M.; S.K.i.
- Miquel Bll.** Bulletin des Sciences Physiques et Naturelles en Néerlande; Miquel,
Mulder, Wenckebach. Leyden, Rotterdam.
1838—40. B.M.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; R.S.
- Mitau Arb. Kurländ. Gs.** Arbeiten der Kurländischen Gesellschaft für Literatur und Kunst.
Mitau.
1847—51. B.M.; Camb.U.
- M. Mscr. J.** The Monthly Microscopical Journal. London.
1869—77. [Continuation of: Transactions of the Microscopical
Society of London, 1844—68.] [Continued as: Journal of the
Royal Microscopical Society, 1878—] B.M.; Camb.U.; Edinb.
R.S.; Edinb.U.; Geol.S.i.; Glasg.U.; N.H.M.; Oxon.R.; P.O.;
R.C.Surg.; R.S.; U.C.L.
- Mm. Fis. Sperim.** Memorie di Fisica sperimentale. Modena.
1837—38. Glasg.P.S.i.
- Mm. Gl. Sv.** Memoirs of the Geological Survey of Great Britain and of the
Museum of Economic Geology in London. London.
1846— Camb.U.; Dub.R.C.S.; Dub.T.C.; Edinb.R.S.; Edinb.U.

List of Serial Publications

- Geol.M.; Geol.S.; Glasg.U.i.; I.CE.; N.H.M.; Oxon.B.; Oxon.R.;
P.O.; R.S.; S.K.; U.C.L.
- See* **G1. Sv. Mm.**
- Mm. Md. Mil.** Recueil de Mémoires de Médecine, de Chirurgie, et de Pharmacie Militaires, rédigé sous le surveillance du Conseil de Santé. Paris.
1815—82. [*Continued as:* Archives de Médecine et de Pharmacie Militaires, 1883—] B.M.; Glasg.U.i.; R.C.Surg.
- Mn. Mg.** The Mineralogical Magazine and Journal of the Mineralogical Society of Great Britain and Ireland. Truro, London.
1876— B.M.; Camb.U.; Chem.S.i.; Dub.N.L.I.; Geol.M.; Geol.S.; Glasg.U.; N.H.M.; Oxon.B.(R.); P.O.; R.S.; S.K.
- Mntp. A. Clin.** Annales Cliniques de la Société Médicale Pratique de Montpellier. Montpellier.
1818—20. B.M.; Glasg.P.S.i.; R.C.Surg.
- Mntp. Ac. Mm.** Académie des Sciences et Lettres de Montpellier. Mémoires de la Section des Sciences. Montpellier.
Mntp. Ac. Sc. Mm. 1847— B.M.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Linn.S.i.; N.H.M.; Oxon.B.; R.A.S.; R.S.; U.C.L.i.
- Mntp. Mm. Ac.** Recueil des Bulletins publiés par la Société Libre des Sciences, etc. de Montpellier. Montpellier.
Mntp. Mm. Ac. Sect. Sc. 1803—14. B.M.; Camb.U.; Oxon.B.i.
- Mntp. Rec. Bll.** Société Languedocienne de Géographie. Bulletin. Montpellier.
1878— B.M.; R.Geogr.S.
- Mntp. S. Lang. Gg. Bll.** Memorie della Regia Accademia di Scienze, Lettere ed Arti di Modena. Modena.
1833— B.M.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Math.S.i.; N.H.M.; Oxon.B.i.; S.K.i.; U.C.L.i.
- Mod. Ac. Sc. Mm.** *See* **Mod. Mm. Ac. Sc.**
Annuario della Società dei Naturalisti in Modena. Modena.
1866—82. [*Continued as:* Atti della Società, etc., 1883—] Camb.U.; Dub.R.I.A.i.; Edinb.R.S.i.; Glasg.P.S.i.; N.H.M.; R.S.
- Mod. An. S. Nt.** *See* **Mod. S. Nt. An.**
See **Mod. Ac. Sc. Mm.**
Memorie di Matematica e di Fisica della Società Italiana delle Scienze. Modena.
1782— B.M.i.; Camb.P.S.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.i.; Glasg.U.i.; Linn.S.i.; Oxon.B.i.; R.A.S.i.; R.C.Surg.i.; R.S.; S.K.i.; U.C.L.i.
- Mod. Mm. Ac. Sc.** *See* **Mod. S. It. Mm., Rm. S. It. Mm., and Verona Mm. S. It.**
See **Mod. An. S. Nt.**
Atti della Società dei Naturalisti di Modena. Modena.
1883— [*Continuation of:* Annuario, etc., 1866—82.] Camb.U.; Dub.R.I.A.i.; N.H.M.
- Mod. Mm. S.** Atti della Società dei Naturalisti di Modena. Rendiconti delle Adunanze. Modena.
1882—86. B.M.; Camb.U.; Glasg.P.S.i.; N.H.M.
- Mod. Mm. S. It.** Cosmos. Revue Encyclopédique Hebdomadaire des Progrès des Sciences; Moigno. Paris.
1852—70. B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; I.CE.i.; N.H.M.; Oxon.B.; P.O.; R.A.S.i.; R.S.; S.K.i.
- Mod. Relazione** *See* **Cosmos.**
Untersuchungen zur Naturlehre des Menschen und der Thiere; Moleschott. Frankfurt-am-Main, Giessen.
1857— B.M.; Camb.U.i.; Glasg.P.S.i.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.i.
- Mod. S. It. Mm.** Buletтино Meteorologico dell' Osservatorio del R. Collegio Carlo Alberto in Moncalieri. Torino.
1866— Glasg.P.S.i.; M.O.; R.A.S.i.
- Mod. S. Nt. An.** *See* **Les Mondes.**
Le Moniteur Scientifique; Quesneville. Paris.
1857— B.M.; Chem.S.i.; Dub.R.C.S.i.; Oxon.B.; Pharm.S.i.; P.O.; R.A.S.i.
- Mod. S. Nt. At.** *See* **Les Mondes.**
Le Moniteur Scientifique; Quesneville. Paris.
1857— B.M.; Chem.S.i.; Dub.R.C.S.i.; Oxon.B.; Pharm.S.i.; P.O.; R.A.S.i.
- Mod. S. Nt. At. (Rd.)** ... Atti della Società dei Naturalisti di Modena. Rendiconti delle Adunanze. Modena.
1882—86. B.M.; Camb.U.; Glasg.P.S.i.; N.H.M.
- Moigno Cosmos** Cosmos. Revue Encyclopédique Hebdomadaire des Progrès des Sciences; Moigno. Paris.
1852—70. B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; I.CE.i.; N.H.M.; Oxon.B.; P.O.; R.A.S.i.; R.S.; S.K.i.
- Moleschott Us.** *See* **Cosmos.**
Untersuchungen zur Naturlehre des Menschen und der Thiere; Moleschott. Frankfurt-am-Main, Giessen.
1857— B.M.; Camb.U.i.; Glasg.P.S.i.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.i.
- Moncalieri Oss. Bll.** Buletтино Meteorologico dell' Osservatorio del R. Collegio Carlo Alberto in Moncalieri. Torino.
1866— Glasg.P.S.i.; M.O.; R.A.S.i.
- Mondes (les)** *See* **Les Mondes.**
Le Moniteur Scientifique; Quesneville. Paris.
1857— B.M.; Chem.S.i.; Dub.R.C.S.i.; Oxon.B.; Pharm.S.i.; P.O.; R.A.S.i.
- Mon. Sc.** *See* **Les Mondes.**
Le Moniteur Scientifique; Quesneville. Paris.
1857— B.M.; Chem.S.i.; Dub.R.C.S.i.; Oxon.B.; Pharm.S.i.; P.O.; R.A.S.i.

List of Serial Publications

- Mosc. Bil. S. Nt.**..... Bulletin de la Société Impériale des Naturalistes. Moscou.
1829— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.;
Dub.R.I.A.; Edinb.R.S.i.; Geol.S.; Glasg.U.i.; Linn.S.; N.H.M.;
Oxon.B.i.; Oxon.R.; P.O.i.; R.A.S.i.; R.C.Surg.i.; R.S.;
S.K.
See Mosc. S. Nt. Bil.
- Mosc. Cm. S. Ps. Md.** ... Commentationes Societatis Physico-Medicæ apud Universitatem
Mosquensem Institutæ. Mosquæ.
1808—21. B.M.; Glasg.P.S.i.; R.S.i.; S.K.i.
- Mosc. N. Mm.**..... Nouveaux Mémoires de la Société Impériale des Naturalistes de
Moscou. Moscou.
1829— B.M.; Camb.U.; Edinb.R.S.i.; Geol.S.i.; Linn.S.i.;
N.H.M.; Oxon.R.i.; R.C.Surg.i.; R.S.i.; S.K.i.
See Mosc. S. Nt. N. Mm.
- Mosc. Obs. A.**..... Annales de l'Observatoire de Moscou; Bredichin. Moscou.
1874— B.M.i.; Camb.U.; R.A.S.; R.S.
- Mosc. S. Nt. Bil.**..... *See Mosc. Bil. S. Nt.*
- Mosc. S. Nt. Mm.**..... Mémoires de la Société Impériale des Naturalistes de Moscou.
Moscou.
1806—23. B.M.; Camb.P.S.i.; Camb.U.; Dub.R.I.A.; Geol.S.;
Glasg.P.S.i.; Linn.S.i.; N.H.M.; R.S.i.; S.K.i.
See Mosc. N. Mm.
- Mosc. S. Nt. N. Mm.** ... *See Mosc. N. Mm.*
- Mosc. S. Sc. Bil.**..... Bulletin of the Imperial Society of Lovers of Natural Science,
Anthropology and Ethnography, in connection with the Imperial
University of Moscow. [In Russian.] Moscow.
1865— B.M.i.; Edinb.R.S.i.; N.H.M.i.; R.C.Surg.i.
- Mosc. Un. Mm.**..... Scientific Memoirs of the Imperial University of Moscow. [In
Russian.] Moscow.
1833—36. B.M.i.; N.H.M.i.
- Mosc. Un. Mm. (Ps-
Mth.)**..... Scientific Memoirs of the Imperial University of Moscow. Physico-
Mathematical Section. [In Russian.] Moscow.
1880—96. Chem.S.; Glasg.P.S.i.; N.H.M.
- Mt. Blanc Obs. A.**..... Annales de l'Observatoire Météorologique [Physique et Glaciaire] du
Mont Blanc. Paris.
1893— B.M.; Camb.U.; Dub.R.D.S.i.; Edinb.R.S.; M.O.; Oxon.R.;
R.S.; S.K.
- Mth. A.**..... Mathematische Annalen; Clebsch. Leipzig.
1869— B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.i.; Dub.R.C.S.i.;
Dub.R.D.S.i.; Dub.T.C.i.; Edinb.U.; Glasg.U.; Math.S.; Oxon.R.;
R.S.; S.K.; U.C.L.
- Mth. Nt. B. Ung.**..... Mathematische und naturwissenschaftliche Berichte aus Ungarn.
Berlin.
1892— Camb.P.S.; Chem.S.; Edinb.R.S.; Glasg.U.i.; R.A.S.i.;
R.Geogr.S.i.; R.S.; S.K.
- Mth. Term. Éts.**..... {
Mth. Term. Éts...... {
Mathematikai és természettudományi Értesítő. Kiadja a Magyar
Tudományos Akadémia. [Mathematical and Natural Science
Report, published by the Hungarian Academy of Science.]
Budapest.
1883— B.M.i.; Edinb.R.S.; N.H.M.; R.S.
- Mth. Ts.**..... Mathematisk Tidsskrift. Kjøbenhavn.
1859—64. [Continued as: Tidsskrift for Matematik, 1865—] B.M.;
Camb.U.; Math.S.i.; Oxon.B.; R.S.i.
- Mt. Ostld.**..... Mittheilungen aus dem Osterlande. Altenburg.
1837— Camb.U.i.; N.H.M.
- Mulder Arch.**..... Natuur- en Scheikundig Archief; Mulder, Wenckebach. Rotterdam,
Leiden.
1833—38. B.M.; Edinb.R.S.; Glasg.P.S.i.; R.S.
- Mulhouse Bil.**..... {
Mulhouse Bil. S. In...... {
Mulhouse S. In. Bil...... {
Bulletin de la Société Industrielle de Mulhouse. Mulhouse.
1828— B.M.i.; Camb.U.i.; Chem.S.i.; Dub.R.C.S.i.; Dub.T.C.i.;
Glasg.P.S.i.; Glasg.U.i.; I.C.E.; Oxon.B.i.; P.O.
- Müller Arch.**..... Archiv für Anatomie, Physiologie, und wissenschaftliche Medicin;
Müller, Reichert, Du Bois-Reymond. Berlin.
1834—76. [Continuation of: Archiv für Anatomie und Physiologie,
1826—32.] [Continued as: Archiv für Anatomie und Physiologie,
1877—] B.M.; Camb.U.; Edinb.U.; Glasg.P.S.i.; Glasg.U.;
N.H.M.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
See Arch. An. Pl. and Reichert Arch.

List of Serial Publications

- Münch. Ab.** (Abhandlungen der mathematisch-physikalischen Classe der Königl. Bayerischen Akademie der Wissenschaften. München.
1829— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.T.C.;
Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.U.; I.CE.i.; Linn.S.;
Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.; R.Geogr.S.; R.S.;
S.K.)
- Münch. Ak. Ab.** (Sitzungsberichte der Königl. Bayerischen Akademie der Wissen-
schaften zu München. München.
1860—70. B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.i.;
Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Geol.S.; I.CE.; Linn.S.;
N.H.M.; Oxon.B.; P.O.i.; R.A.S.; R.C.Surg.i.; R.Geogr.S.;
R.S.; S.K.)
- Münch. Ak. Sb.** (Sitzungsberichte der Mathematisch-Physikalischen Classe der K. B.
Akademie der Wissenschaften zu München. München.
1871— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.T.C.;
Edinb.R.S.; Glasg.U.i.; I.CE.i.; Linn.S.; Oxon.B.; Oxon.R.;
P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.)
- Münch. Bil. Ak.** *See* **Münch. Sb.**
Bulletin der k. Akademie der Wissenschaften. München.
1843—53. B.M.i.; Edinb.R.S.i.; I.CE.i.; Oxon.B.i.; R.A.S.;
R.Geogr.S.i.; R.S.)
- Münch. D.** Denkschriften der Königl. Bayerischen Akademie der Wissenschaften
zu München. München, Salzbach.
1808—24. B.M.; Camb.P.S.; Camb.U.; Geol.S.i.; Glasg.U.; N.H.M.;
Oxon.R.; P.O.; R.C.Surg.; R.S.; S.K.)
- Münch. Gelehrte Az.** ... Gelehrte Anzeigen; herausgegeben von Mitgliedern der Königl.
Baierischen Akademie der Wissenschaften. München.
1835—60. B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Linn.S.i.;
N.H.M.; Oxon.B.; P.O.; R.S.; S.K.)
- Münch. Gs. Mph. Pl. Sb.** Sitzungsberichte der Gesellschaft für Morphologie und Physiologie
in München. München.
1885— Camb.U.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.)
- Münch. Wt. Tech. Com.** Abhandlungen der naturwissenschaftlich-technischen Commission
bei der Königl. Baierischen Akademie. München.
1857—58. Camb.U.; R.S.)
- Münch. Sb.** *See* **Münch. Ak. Sb.**
- Münch. Z. Archt.** Zeitschrift des Bayerischen Architekten- und Ingenieur-Vereins,
München.
1869—77. P.O.)
- N. Al. J. C.** Neues allgemeines Journal der Chemie. Berlin.
1803—06. [*Continuation of*: Allgemeines Journal, etc., 1798—1802.]
[*Continued as*: Journal für die Chemie und Physik, 1806—10.]
B.M.; Glasg.P.S.i.; N.H.M.; Oxon.R.; R.S.)
- N. A. Mth.** Nouvelles Annales de Mathématiques. Paris.
1842— B.M.; Camb.U.; Dub.T.C.; Edinb.U.; Glasg.U.; Math.S.i.;
Oxon.B.(R.); R.S.; S.K.; U.C.L.i.)
- Nancy Mm. Ac. Stanislas** Académie de Stanislas. Mémoires de la Société [Royale] des
Sciences, etc. Nancy.
1852— [*Continuation of*: Mémoires de la Société, etc., 1833—51.]
B.M.; Camb.U.; Geol.S.i.; Oxon.B.; R.S.i.; S.K.)
- Nancy Mm. S. Sc.** Mémoires de la Société [Royale] des Sciences, Lettres et Arts de
Nancy. Nancy.
1833—51. [*Continuation of*: Précis analytique des Travaux de la
Société, etc., 1802—32.] [*Continued as*: Académie de Stanislas.
Mémoires, etc., 1852—] B.M.; Camb.U.i.; N.H.M.i.; Oxon.B.;
R.S.i.; S.K.)
- Nancy S. Sc. Bil.** Bulletin de la Société des Sciences de Nancy. Nancy, Paris.
1873— B.M.; Geol.S.i.; N.H.M.; R.Geogr.S.i.; R.S.)
- Nancy Tr. S. Sc.** Précis analytique des Travaux de la Société [Royale] des Sciences,
Arts et Agriculture de Nancy. Nancy.
1802—32. [*Continued as*: Mémoires de la Société, etc., 1833—51.]
B.M.; Camb.U.i.; Oxon.B.; R.S.i.)
- Nantes A. S. Ac.** Annales de la Société Académique de Nantes et du Département de
la Loire Inférieure. Nantes.
1830— Camb.U.; Glasg.P.S.i.; Oxon.B.)

List of Serial Publications

- N. Antol. Sc.** Nuova Antologia di Scienze, Lettere ed Arti. Firenze, Roma.
1866— B.M.; Dub.N.L.I.i.; N.H.M.
- Nap. Ac. Asp. A.** Annali dell' Accademia degli Aspiranti Naturalisti. Napoli.
1843—47; 1861—69; 1887. Camb.U.i.; N.H.M.; R.S.i.
- Nap. Ac. At.** Atti della Reale Accademia delle Scienze e Belle Lettere; Sezione della Società R. Barbonica. Napoli.
1819—51. B.M.; Camb.U.; Dub.R.D.S.; Geol.S.i.; N.H.M.; Oxon.B.; R.A.S.i.; R.C.Surg.i.; R.S.
Atti della R. Accademia delle Scienze Fisiche e Matematiche. Napoli.
1863—82; 1888— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Geol.S.i.; Glasg.U.i.; Linn.S.i.; Math.S.i.; N.H.M.; Oxon.B.i.; Oxon.R.; R.A.S.i.; R.S.; S.K.i.
- Nap. Ac. Pont. At.** See **Nap. At. Ac.**
Atti dell' Accademia Pontaniana di Napoli. Napoli.
1832— B.M.; Camb.U.; Dub.R.D.S.i.; Glasg.U.i.; N.H.M.; R.S.i.; U.C.L.i.
- Nap. Ac. Sc. Mm.** Memorie della R. Accademia delle Scienze, etc. Napoli.
1852—57. B.M.; Camb.U.; Dub.R.D.S.; Edinb.R.S.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.A.S.; R.S.
- Nap. At. Ac.** } See **Nap. Ac. At.**
Nap. At. Ac. Sc. }
Nap. At. I. Inc. Atti del Real Istituto d' Incoraggiamento alle Scienze Naturali di Napoli. Napoli.
1811— B.M.; Camb.U.; Edinb.R.S.i.; I.CE.i.; N.H.M.; Oxon.B.; P.O.; R.C.Surg.i.; R.S.i.; S.K.i.
- Nap. Bil. Ac. Asp.** See **Nap. I. Inc. At.**
Bullettino dell' Accademia degli Aspiranti Naturalisti. Napoli.
1842; 1861—64. Camb.U.i.; N.H.M.
- Nap. I. Inc. At.** See **Nap. At. I. Inc.**
- Nap. Ms.** Museo di Letteratura e Filosofia; Gatti. Napoli.
1842—62. B.M.; Oxon.B.
- Nap. Rd.** Rendiconto delle adunanze e de' lavori della Reale Accademia delle Scienze [Fis. e Mat.] di Napoli. Napoli.
1842—57. B.M.; Camb.U.; Edinb.R.S.i.; Linn.S.i.; N.H.M.; Oxon.B.i.; Oxon.R.; R.A.S.i.; R.S.i.
- Nap. Rd.** Rendiconto dell' Accademia delle Scienze Fisiche e Matematiche. Napoli.
1862— Camb.U.; Dub.R.I.A.; Edinb.R.S.; Glasg.U.i.; Linn.S.i.; Math.S.; N.H.M.; Oxon.R.i.; P.O.; R.A.S.; R.S.; U.C.L.i.
- Nap. S. Nt. Bil.** Bollettino della Società di Naturalisti in Napoli. Napoli.
1887— B.M.; Camb.P.S.; N.H.M.; R.S.
- N. Arch. Wisk.** Nieuw Archief voor Wiskunde. Amsterdam.
1875— Camb.P.S.i.; Edinb.R.S.i.; Math.S.
- N. A. Sc. Nt.** Nuovi Annali delle Scienze naturali; Alessandrini, Bertolini, Gherardi e Ranzani. Bologna.
1838—54. Camb.U.; Geol.S.i.; N.H.M.; Oxon.B.i.; R.Geogr.S.i.; R.S.
- Nass. Jb.** } See **Bologna N. A.**
Nass. Vr. Jb. } Jahrbücher des Vereins für Naturkunde im Herzogthum Nassau. Wiesbaden.
- Nauche J. du Galvan.** ... 1844— B.M.; Camb.P.S.i.; Camb.U.; Linn.S.; N.H.M.; R.S.i.; S.K.
1803. B.M.; Glasg.P.S.i.
- N. Bergm. J.** Neues bergmännisches Journal; Kohlen und Hoffmann. Freiberg.
1795—1816. B.M.i.; Geol.S.i.; N.H.M.; R.S.; S.K.i.
- N. Brunsw. NH. S. Bil.** ... Bulletin of the Natural History Society of New Brunswick. St John.
1882— Geol.S.; Glasg.P.S.i.; N.H.M.; R.S.i.
- N. Cim.** Il Nuovo Cimento, Giornale di Fisica, Chimica e Storia Naturale. Pisa.
1855— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Edinb.R.S.i.; I.CE.i.; N.H.M.; Oxon.R.i.; P.O.i.; R.S.
- Ndl. Arch. Ntk.** Nederlandsch Archief voor Genees- en Natuurkunde. Utrecht.
1865—70. [Continuation of: Archiv für die Holländischen Beiträge zur Natur- und Heilkunde, 1858—64.] B.M.; Glasg.P.S.i.; R.S.i.

List of Serial Publications

- Ndl. Gast. Oogl. Vs.** Nederlandsch Gasthuis voor Behoeftige en Minvermogene Ooglijders te Utrecht. Verslag. Utrecht.
1885— [Continuation of: Jaarlijksch Verslag betrekkelijk de Verpleging en 't Onderwijs in het Nederlandsch Gasthuis voor Ooglijders; Donders, 1860—85.] R.S.
- Ndl. Kruidk. Arch.** Nederlandsch Kruidkundig Archief. [Verslagen en Mededeelingen der Nederlandsche Botanische Vereeniging.] Leiden, Amsterdam, Leeuwarden, Nijmegen.
1846— B.M.i.; Edinb.R.S.i.; Linn.S.; N.H.M.; R.S.
- Ndl. Lancet** Nederlandsch Lancet. Tijdschrift aan de praktische Chirurgie, etc. Utrecht.
1838—56. B.M.; Glasg.P.S.i.; R.C.Surg.i.
- Ndösterr. Gewerb.-Vr. Vh.** Verhandlungen des Niederösterreichischen Gewerb-Vereins. Wien.
1840— B.M.i.; P.O.; S.K.i.
- Nebr. Un. Stud.** University Studies. Published by the University of Nebraska. Lincoln, Nebraska.
1888— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Oxon.B.; R.S.
- N. Eng. I. Mn. E. T.** Transactions of the North of England Institute of Mining Engineers. Newcastle-upon-Tyne.
1852— B.M.; Camb.U.; Edinb.R.S.i.; Geol.S.; Glasg.U.i.; I.CE.; Oxon.B.i.; P.O.i.; R.S.; S.K.; U.C.L.i.
- Neuch. Bil.** Bulletin de la Société des Sciences Naturelles de Neuchâtel.
Neuch. S. Sc. Bil. Neuchâtel.
1844— B.M.i.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.i.; M.O.i.; N.H.M.; Oxon.B.i.; R.A.S.i.; R.S.i.; S.K.i.
- Newcastle C. S. T.** Newcastle-upon-Tyne Chemical Society. Transactions. Newcastle-upon-Tyne.
1868—83. B.M.; Chem.S.; Oxon.B.; Pharm.S.i.; P.O.; R.S.
- NH. Rv.** The Natural History Review and Quarterly Journal of Science. London, Dublin.
1854—60. B.M.; Camb.U.; Dub.R.D.S.; Dub.T.C.; Glasg.P.S.; Linn.S.; N.H.M.; Oxon.R.; P.O.; R.C.Surg.; S.K.; U.C.L.i.
The Natural History Review; a Quarterly Journal of Biological Science. London.
1861—65. B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Dub.T.C.; Edinb.R.S.; Geol.S.; Glasg.P.S.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.; R.C.Surg.; R.S.; S.K.
- Nice Obs. A.** Annales de l'Observatoire de Nice. Paris.
1887— B.M.; Edinb.R.S.i.; Glasg.P.S.i.; Glasg.U.i.; R.A.S.; R.S.; S.K.
- Nicholson J.** Journal of Natural Philosophy, Chemistry, and the Arts; Nicholson. London.
1797—1813. [Continued in: The Philosophical Magazine, 1814—] B.M.; Camb.U.; Chem.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.i.; R.S.; S.K.; U.C.L.
- Nim. S. Sc. Bil.** Bulletin de la Société d'Étude des Sciences Naturelles de Nîmes. Nîmes.
1873— N.H.M.i.
- N. Jb. Mn.** Neues Jahrbuch für Mineralogie, Geologie und Paläontologie. Stuttgart.
1863— [Continuation of: Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefaktenkunde, 1833—62.] B.M.; Camb.U.; Chem.S.i.; Dub.N.L.I.i.; Dub.R.D.S.i.; Geol.M.; Geol.S.; Glasg.U.; I.CE.i.; N.H.M.; Oxon.R.; R.S.; S.K.i.
- N. Mg. Ntvd.** Nyt Magazin for Naturvidenskaberne. Christiania.
1838— [Continuation of: Magazin for Naturvidenskaberne, 1823—36.] Camb.U.i.; Edinb.R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; R.S.; S.K.
- Nord. Arch.** Nordisches Archiv für Naturkunde und Arzneiwissenschaft. Kopenhagen, Frankfurt an der Oder.
1799—1801. B.M.; Glasg.P.S.i.; R.C.Surg.
- Norm. S. L. Bil.** Bulletin de la Société Linnéenne de Normandie. Caen.
1855— B.M.; Camb.U.; Geol.S.i.; Glasg.P.S.i.; Linn.S.; N.H.M.; R.S.i.; U.C.L.i.
- See **Caen S. L. Bil.**

List of Serial Publications

- N. Rs. S. Nt. Mm.** Mémoires de la Société des Naturalistes de la Nouvelle-Russie. [In Russian.] Odessa.
1872— B.M.; Camb.P.S.i.; Edinb.R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; R.S.i.
- N. Rs. S. Nt. Mm. (Mth.)** Memoirs of the Mathematical Section of the New Russian Society of Naturalists. [In Russian.] Odessa. ...
1878— Dub.R.I.A.; Math.S.i.; R.S.i.
- N. Scotia I. Sc. P. & T.** Proceedings and Transactions of the Nova Scotia Institute of Natural Science. Halifax, Nova Scotia.
1863— Camb.P.S.i.; Chem.S.i.; Edinb.R.S.i.; Geol.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.; Pharm.S.i.; P.O.i.; R.A.S.i.; R.Geogr.S.i.; R.S.i.; U.C.L.i.
- N. S. W. R. S. J.** Journal and Proceedings of the Royal Society of New South Wales. Sydney.
1876— [Continuation of: Transactions, etc., 1867—75.] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.T.C.; Edinb.R.S.i.; Geol.M.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; I.CE.; Linn.S.i.; M.O.; N.H.M.; Oxon.B.; Oxon.R.i.; Pharm.S.i.; P.O.i.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.
- N. S. W. R. S. T.** Transactions of the Royal Society of New South Wales. Sydney.
1867—75. [Continued as: Journal and Proceedings, etc., 1876—] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.i.; Geol.M.i.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.i.
- Nt.** Nature: a weekly illustrated Journal of Science. London.
1870— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.; Linn.S.; M.O.; Oxon.B.; Oxon.R.; Pharm.S.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Ntleza.** La Naturaleza. Periódico científico de la Sociedad Mexicana de Historia Natural. México.
1870— B.M.i.; Edinb.R.S.i.; Geol.S.i.; N.H.M.i.
- N. Ts. Fs. K.** Nyt Tidsskrift for Fysik og Kemi. Kjøbenhavn.
1896—98. [Continuation of: Tidsskrift for Fysik og Kemi, 1862—94.] B.M.; Glasg.P.S.i.
- N. Ts. Mth.** Nyt Tidsskrift for Matematik. Kjøbenhavn.
1890— [Continuation of: Tidsskrift for Matematik, 1865—89.] B.M.; Math.S.i.
- Nürnb. Ab.** Abhandlungen der Naturhistorischen Gesellschaft zu Nürnberg. Nürnberg.
1852— B.M.i.; Camb.U.; Dub.R.I.A.; N.H.M.; R.S.i.; S.K.
- Nv. Archt. T.** Transactions of the Institution of Naval Architects. London.
1860— B.M.; Camb.U.; Dub.R.I.A.; Edinb.U.; Glasg.U.; I.CE.; P.O.; R.S.; S.K.i.; U.C.L.i.
- N. Vorp. Mt.** Mittheilungen aus dem Naturwissenschaftlichen Vereine von Neu-Vorpommern und Rügen. Berlin.
1869— B.M.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; N.H.M.; R.C.Surg.i.; S.K.
- Nv. Sc.** Naval Science: a Quarterly Magazine for promoting the improvement of Naval Architecture, Marine Engineering, Steam Navigation and Seamanship. London.
1872—76. B.M.i.; Camb.U.i.; Glasg.U.i.; I.CE.i.; M.O.i.; Oxon.B.i.; P.O.; S.K.
- N. Y. Ac. A.** Annals of the New York Academy of Sciences, late Lyceum of Natural History. New York.
1879— [Continuation of: Annals of the Lyceum of Natural History, 1824—77.] B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Geol.S.; Linn.S.i.; N.H.M.; Oxon.R.i.; P.O.; R.S.; S.K.; U.C.L.i.
- N. Y. Ac. T.** Transactions of the New York Academy of Sciences, late Lyceum of Natural History. New York.
1881—98. B.M.; Glasg.U.i.; Linn.S.i.; N.H.M.; Oxon.R.i.; P.O.i.; R.S.; S.K.; U.C.L.i.
- N. Y. A. Lyceum** Annals of the Lyceum of Natural History of New York. New York.
1824—77. [Continued as: Annals of the New York Academy of

List of Serial Publications

- Sciences, 1879—] B.M.; Camb.U.; Dub.R.D.S.; Edinb.R.S.i.;
Edinb.U.i.; Geol.S.i.; Linn.S.; N.H.M.; Oxon.R.i.; P.O.; R.S.;
S.K.
- See N. Y. Lyceum A.**
Bulletin of the American Mathematical Society. New York.
1895— [Continuation of: Bulletin of the New York Mathematical
Society, 1892—94.] B.M.; Camb.P.S.; Camb.U.; Dub.T.C.;
Edinb.R.S.; Edinb.U.; Glasg.P.S.; Glasg.U.; Math.S.; Oxon.B.;
Oxon.R.; R.S.i.
- N. Y. Am. Mth. S. Bil.** ... Transactions of the American Mathematical Society. Lancaster,
Pa. and New York.
1900— Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.;
Edinb.U.; Glasg.U.; Math.S.; Oxon.B.; Oxon.R.; R.S.; S.K.
- N. Y. Am. Mth. S. T.** ...
- N. Y. Lyceum A.** **See N. Y. A. Lyceum.**
- N. Y. Lyceum P.** Proceedings of the Lyceum of Natural History in the City of New
York. New York.
1870—74. B.M.; Geol.S.; Glasg.P.S.i.; Linn.S.; N.H.M.; R.S.;
S.K.i.
- N. Y. Md. J.** The New York Medical Journal. New York.
1865— Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.; R.C.Surg.; R.S.i.
- N. Y. Md. Rep.** Medical Repository of New York. New York.
1798—1812. B.M.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.i.; U.C.L.i.
- N. Y. Ms. Bil.** University of the State of New York. Bulletin of the New York
State Museum. Albany.
1887— Camb.P.S.i.; Dub.R.I.A.; Edinb.R.S.; Geol.M.; Glasg.
P.S.i.; Glasg.U.i.; N.H.M.; Oxon.B.; R.S.; S.K.i.
- N. Y. Mth. S. Bil.** Bulletin of the New York Mathematical Society. New York.
1892—94. [Continued as: Bulletin of the American Mathematical
Society, 1895—] B.M.; Camb.P.S.; Camb.U.; Edinb.R.S.;
Glasg.P.S.; Glasg.U.; Math.S.; Oxon.B.; Oxon.R.; R.A.S.i.
- N. Z. Col. Ms. Gl. Sv. Rp.** Colonial Museum and Geological Survey of New Zealand. Reports
of Geological Explorations. Wellington.
1870—73. [Continued as: New Zealand. Papers and Reports
relating to Minerals and Mining, 1894—] B.M.; Edinb.R.S.i.;
Edinb.U.i.; Geol.S.i.; I.C.E.i.; Linn.S.i.; N.H.M.; P.O.i.;
R.Geogr.S.i.; R.S.i.; U.C.L.i.
- N. Z. I. T.** Transactions and Proceedings of the New Zealand Institute.
Wellington.
1868— B.M.; Camb.P.S.i.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.;
Edinb.R.S.; Edinb.U.; Geol.M.i.; Geol.S.; Glasg.P.S.i.;
Glasg.U.i.; I.C.E.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.;
R.Geogr.S.; R.S.; S.K.i.; U.C.L.i.
- N. Z. Pp. & Rp. (Mn.)** ... New Zealand. Papers and Reports relating to Minerals and Mining.
Wellington.
1894— [Continuation of: Colonial Museum and Geological Survey
of New Zealand. Reports of Geological Explorations, 1870—93.]
Edinb.R.S.i.; Geol.S.i.; P.O.; R.Geogr.S.i.
- Obs.** The Observatory. A monthly Review of Astronomy. London.
1878— Camb.P.S.; Camb.U.; Dub.T.C.i.; Edinb.R.S.; Oxon.R.;
P.O.; R.A.S.; S.K.
- Oestr. Wschr.** Oesterreichische Wochenschrift für Wissenschaft, Kunst, und
öffentliches Leben. Beilage zur K. Wiener Zeitung. Wien.
1863—64. Glasg.P.S.i.
- Oestr. Z. Brgw.** Oesterreichische Zeitschrift für Berg- und Hüttenwesen; von
Hingenau. Wien.
1853— B.M.; I.C.E.; P.O.; S.K.
- Offenb. Vr. Nt. B.** Bericht über die Thätigkeit des Offenbacher Vereins für Naturkunde.
Offenbach a. M.
1860— Edinb.R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; R.S.i.; S.K.i.
- Ó-Gyalla Asps. Obs.** Beobachtungen angestellt am Astrophysikalischen [und Meteoro-
logischen] Observatorium in Ó-Gyalla in Ungarn. Halle,
Budapest.
1879— M.O.i.; R.A.S.; R.S.i.; S.K.i.
- Oken Isis** Isis, oder Encyclopädische Zeitung; Oken. Jena.
1817—48. B.M.i.; Camb.U.; Edinb.U.; Glasg.U.; Linn.S.i.;
N.H.M.; Oxon.B.(R.); R.C.Surg.i.; R.S.; S.K.i.

List of Serial Publications

- Omodei A. Un.** Annali Universali di Medicina; Omodei, Calderini. Milano.
1817—88. B.M.i.; Glasg.P.S.i.; R.C.Surg.
- Oph. Bb.** Ophthalmologische Bibliothek. Braunschweig.
1802—05. Glasg.P.S.i.; R.C.Surg.i.
- Opusc. Mt. Fis.** Opuscoli matematici e fisici di diversi Autori. Milano.
1832—34. R.S.
- Orléans Bll.** Bulletin des Sciences Physiques, Médicales et d'Agriculture
d'Orléans. Orléans.
1810—13. B.M.; Oxon.B.
- Ørsted Ts.** Tidsskrift for Naturvidenskaberne; Ørsted. Kjöbenhavn.
1822—28. B.M.; Camb.U.; N.H.M.; R.S.
- Orv.-Termt. Éts.** Orvos-Természettudományi Értesítő a Kolozsvári Orvos-Természettu-
dományi Társulat és az Erdélyi Muzeum-Egylet Természettu-
dományi Szakosztályának..... [Medical and Natural History
Proceedings of the Sections of the Klausenburg Medical and
Natural History Society and of the Natural History Section of the
Museum Association of Transylvania.] Kolozsvár [Klausenburg].
1879— N.H.M.; R.S.i.
- Osnab. Jbr.** Jahresbericht des Naturwissenschaftlichen Vereins zu Osnabrück.
Osnabrück.
1870— Edinb.R.S.i.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; R.S.
- Padova Ac. At. e Mm.** ... Atti e Memorie della R. Accademia di Scienze, Lettere ed Arti in
Padova. Nuova serie. Padova.
1885— [Continuation of: Nuovi Saggi dell' Accademia, etc. 1817—83.]
Edinb.R.S.; Geol.S.i.; N.H.M.
- Padova Mm. Ac.** Memorie dell' Accademia di Scienze, Lettere ed Arti di Padova.
Padova.
1809. B.M.; Camb.U.; N.H.M.; Oxon.B.; R.S.; S.K.
- Padova N. Sag.** Nuovi Saggi dell' Accademia di Scienze, Lettere, ed Arti di Padova.
Padova.
1817—83. [Continued as: Atti e Memorie della R. Accademia, etc.
1885—] B.M.i.; Camb.U.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.
R.S.; N.H.M.; Oxon.B.i.; R.C.Surg.i.; R.S.i.; S.K.i.
- Padova Rv. Period.** Rivista Periodica dei Lavori della I. R. Accademia di Scienze,
Lettere ed Arti di Padova. Padova.
1851—65. B.M.; Edinb.R.S.i.; Geol.S.; N.H.M.; R.S.
- Padova S. Sc. At.** Atti della Società Veneto-Trentina di Scienze Naturali residente in
Padova. Padova.
1872— Glasg.P.S.i.; N.H.M.
- Padova S. Sc. Bll.** Bullettino della Società Veneto-Trentina di Scienze Naturali.
Padova.
1879— B.M.; N.H.M.
- Palermo Ac. At.** Atti dell' Accademia di Scienze, Lettere ed Arti di Palermo. Palermo.
- Palermo At.** 1845— B.M.; Camb.U.i.; Dub.R.I.A.; Dub.T.C.; Glasg.U.i;
N.H.M.; Oxon.B.i.; R.A.S.i.; R.C.Surg.i.; R.S.i.
- Palermo Cir. Mt. Rd.** ... Rendiconti del Circolo Matematico di Palermo. Palermo.
1887— B.M.i.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.;
Math.S.; R.S.
- Palermo Effem.** Effemeridi Scientifiche e Letterarie per la Sicilia; coi Lavori del
R. Istituto d' Incoraggiamento per la Sicilia. Palermo.
1832—40. Glasg.P.S.i.; N.H.M.
- Palermo G. I. Inc.** Giornale del R. Istituto d' Incoraggiamento di Agricoltura, Arti, etc.
in Sicilia. Parte 3. Scienze Fisico-Matematiche e Naturali.
Palermo.
1863. Glasg.P.S.i.
- Palermo G. Sc. Nt.** Giornale di Scienze naturali ed economiche, pubblicato per cura del
Consiglio di Perfezionamento annesso al R. Istituto Tecnico di
Palermo. Palermo.
1865— B.M.; Camb.U.; Dub.R.D.S.i.; Geol.S.i.; R.S.
- Palermo Mm. Spet. It.** ... Memorie della Società degli Spettroscopisti Italiani, raccolte e
pubblicate per cura del Prof. P. Tacchini. Palermo.
1872— B.M.i.; Camb.U.; Edinb.R.S.i.; P.O.; R.A.S.; R.S.
See Spet. It. Mm.
- Palomba Rac.** Raccolta di Lettere, etc. intorno alla Fisica ed alle Mathematiche;
Palomba. Roma.
1845—48. B.M.i.

List of Serial Publications

- Pander Btr. Ntk.** Beiträge zur Naturkunde aus den Ostseeprovinzen Russlands; Pander. Dorpat.
1820. Glasg.P.S.i.; N.H.M.; R.S.
- Par. A. Cons.** Annales du Conservatoire des Arts et Métiers. Paris.
1861— B.M.; Camb.U.; Glasg.P.S.i.; I.CE.i.; Oxon.B.; P.O.; R.S.; S.K.i.
See A. Cons. Arts et Mét.
- Par. Ac. Sc. Mm.** Mémoires de l'Académie des Sciences de l'Institut de France. Paris.
1816— B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.D.S.i.; Dub.T.C.i.; Edinb.R.S.i.; Edinb.U.; Geol.S.i.; Glasg.U.; I.CE.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.A.S.i.; R.C.Surg.; R.S.; S.K.; U.C.L.
- See Par. Mm. Ac. Sc.*
- Par. A. das Sc.** Annaes das Sciencias, etc. por huma Sociedade de Portuguezes residentes em Paris. Paris.
1818—27. B.M.; Camb.U.i.
- See A. das Sc.*
- Par. A. Éc. Norm.** Annales scientifiques de l'École Normale Supérieure. Paris.
1864— B.M.; Camb.P.S.i.; Camb.U.; Dub.N.L.I.i.; Dub.R.C.S.i.; Dub.R.D.S.i.; Edinb.R.S.i.; Edinb.U.i.; Glasg.U.i.; Oxon.B.; R.S.; S.K.
- See Par. Éc. Norm. A.*
- Par. A. Obs.** Annales de l'Observatoire de Paris. Mémoires. Paris.
1855— B.M.; Camb.U.; Dub.N.L.I.; Dub.T.C.; Edinb.R.S.; Glasg.U.i.; Oxon.B.; R.A.S.; R.S.
- See Par. Obs. A.*
- Par. A. Pon. Chauss.** Annales des Ponts et Chaussées. Mémoires et documents relatifs à l'Art des Constructions et au Service de l'Ingénieur. Paris.
1831— B.M.; Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.; P.O.; R.S.i.
- See A. Pon. Chauss.*
- Par. Bll. S. Bt.** Bulletin de la Société Botanique de France. Paris.
1854— B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.i.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.; Pharm.S.i.; S.K.
- See Fr. S. Bt. Bll.*
- Par. Bll. S. C.** Bulletin de la Société Chimique de Paris. Paris.
1858— B.M.; Camb.U.i.; Chem.S.; Dub.N.L.I.i.; Dub.R.C.S.i.; Dub.R.D.S.i.; Edinb.U.i.; Glasg.U.i.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.; R.S.; S.K.
- See Par. S. C. Bll.*
- Par. Bll. S. Encour.** Bulletin de la Société d'Encouragement pour l'Industrie Nationale. Paris.
1802— Camb.U.; Dub.R.C.S.i.; Dub.T.C.i.; Edinb.R.S.i.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Oxon.B.; P.O.; R.S.; S.K.i.
- Par. Bll. S. Gg.** Bulletin de la Société de Géographie. Paris.
1822— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.; U.C.L.i.
- See Par. Gg. S. Bll. and Par. S. Gg. Bll.*
- Par. Bll. S. Phlm.** Bulletin des Sciences de la Société Philomathique de Paris. Paris.
1791—1805; 1814—24; 1864— B.M.i.; Camb.U.; Dub.T.C.i.; Edinb.R.S.i.; Glasg.U.i.; Math.S.i.; N.H.M.; Oxon.R.i.; P.O.i.; R.A.S.i.; R.C.Surg.i.; R.S.; U.C.L.
- See Par. S. Phlm. Bll.*
- Par. Bur. Long. An.** Annuaire publié par le Bureau des Longitudes. Paris.
1799— B.M.; Camb.U.i.; Edinb.U.i.; Glasg.U.i.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.
- Par. Cl. Alp. Fr. An.** Annuaire du Club Alpin Français. Paris.
1875— B.M.; Geol.S.i.; R.Geogr.S.
- Par. Éc. Norm. A.** *See Par. A. Éc. Norm.*
- Par. Éc. Pol. Cor.** Correspondance sur l'École Polytechnique, à l'usage des Élèves de cette École; Hachette. Paris.
1808—16. B.M.i.; Oxon.B.; R.S.; U.C.L.
- Par. Éc. Pol. J.** Journal de l'École Polytechnique. Paris.
1795— B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; I.CE.i.; Linn.

List of Serial Publications

- S.i.; Math.S.i.; Oxon.B.(R.); P.O.; R.A.S.i.; R.S.; S.K.; U.C.L.i.
 See **Par. J. Éc. Pol.**
Par. Gg. S. Bil. See **Par. Bil. S. Gg. and Par. S. Gg. Bil.**
Par. Ing. Civ. Mm. Mémoires et Comptes Rendus des Travaux de la Société des Ingénieurs Civils. Paris.
 1848— B.M.; Glasg.U.i.; I.CE.; P.O.
 See **Par. Mm. Ing. Civ.**
Par. J. Éc. Pol. See **Par. Éc. Pol. J.**
Par. Lb. Hl. Tr. École Pratique des Hautes Études. Laboratoire d'Histologie du Collège de France. Travaux. Paris.
 1877— B.M.; Camb.U.; Oxon.R.; R.C.Surg.i.; R.S.; U.C.L.i.
Parma G. S. Md. Chir. ... Giornale della Società Medico-Chirurgica di Parma. Parma.
 1806—18. B.M.; Glasg.P.S.i.
Par. Mm. Ac. Sc. See **Par. Ac. Sc. Mm.**
Par. Mm. de l'I. Mémoires de la Classe des Sciences mathématiques et physiques de l'Institut. Paris.
 1798—1815. B.M.; Edinb.R.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.; S.K.; U.C.L.
Par. Mm. Ing. Civ. See **Par. Ing. Civ. Mm.**
Par. Mm. Sav. Étr. Mémoires présentés à l'Institut des Sciences, Lettres et Arts par divers Savans, et lus dans ses Assemblées: Sciences Mathématiques et Physiques. Paris.
 1806—11. B.M.; Camb.U.; Dub.R.D.S.; Dub.T.C.; Edinb.R.S.; Glasg.U.; I.CE.; N.H.M.; Oxon.R.; P.O.; R.A.S.; R.C.Surg.; R.S.; S.K.; U.C.L.
 Mémoires présentés par divers Savans à l'Académie des Sciences de l'Institut de France. Paris.
 1827— B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; Geol.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.A.S.i.; R.C.Surg.; R.S.; S.K.
Par. Mm. S. L. Mémoires de la Société Linnéenne de Paris. Paris.
 1822—27. B.M.; Camb.U.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; Oxon.R.i.; R.S.i.
Par. Mm. S. Sav. Mémoires des Sociétés Savantes et Littéraires de la République Française. Recueillis et rédigés par les Citoyens Prony, etc. Paris.
 1801—02. B.M.; Oxon.B.; R.S.
Par. Ms. H. Nt. Bil. Bulletin du Muséum d'Histoire Naturelle. Paris.
 1895— B.M.; Camb.U.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.R.; R.S.; S.K.
Par. Ms. H. Nt. Cent. ... Centenaire de la Fondation du Muséum d'Histoire Naturelle. Paris.
 1893. B.M.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; N.H.M.; R.S.
Par. Ms. H. Nt. Mm. ... Mémoires du Muséum d'Histoire Naturelle. Paris.
 1815—32. B.M.; Camb.P.S.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
Par. Ms. H. Nt. N. Arch. ... Nouvelles Archives du Muséum d'Histoire Naturelle. Paris.
 1865— [Continuation of: Archives, etc., 1839—61.] B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.; R.S.; S.K.i.
Par. Obs. A. } See **Par. A. Obs.**
Par. Obs. A. (Mm.) }
Par. Poids et Mes. PV. Comité International des Poids et Mesures. Procès-Verbaux des Séances. Paris.
 1875— Camb.P.S.; Camb.U.i.; Dub.R.D.S.; Glasg.U.i.; M.O.i.; Oxon.R.; P.O.; R.A.S.; R.S.; S.K.i.
Par. Poids et Mes. Tr. Mm. ... Travaux et Mémoires du Bureau International des Poids et Mesures. Paris.
 1881— Camb.P.S.; Camb.U.; Chem.S.; Glasg.U.i.; I.CE.i.; Oxon.B.; Oxon.R.; R.A.S.; R.S.; S.K.; U.C.L.
Par. S. Bl. Mm. Comptes Rendus des Séances et Mémoires de la Société de Biologie. Paris.
 1849— B.M.i.; Camb.P.S.i.; Camb.U.; Chem.S.i.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.U.i.; Glasg.U.i.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.i.; S.K.i.

List of Serial Publications

- Par. S. Bl. (Vol. Jubil.)...** Cinquantenaire de la Société de Biologie. ...Volume Jubilaire. Paris. 1899. Edinb.R.S.; R.C.Surg.; R.S.
- Par. S. C. Bl.** See **Par. Bl. S. C.**
- Par. S. Chir. Bl. et Mm.** Bulletins et Mémoires de la Société de Chirurgie de Paris. Paris. 1875— [Continuation of: Bulletins, 1851—74, and Mémoires, 1847—74.] Camb.U.; Glasg.P.S.i.; Oxon.B.(R.); R.C.Surg.
- Par. Sé. Éc. Norm.** Séances des Écoles Normales. Paris. 1800—01. R.S.; U.C.L.
- Par. Sé. S. Ps.** Séances de la Société Française de Physique. Paris. 1873— B.M.i.; Camb.P.S.i.; Glasg.U.i.; P.O.; R.S.; S.K.
See **Par. S. Ps. Sé.**
- Par. S. Gg. Bl.** See **Par. Bl. S. Gg. and Par. Gg. S. Bl.**
- Par. S. Gg. C. R.** Compte Rendu des Séances de la Société de Géographie et de la Commission Centrale. Paris. 1882— B.M.; Camb.U.; N.H.M.i.; Oxon.B.; R.Geogr.S.; R.S.i.; U.C.L.i.
- Par. S. Gl. Bl.** Bulletin de la Société Géologique de France. Paris. 1830— B.M.; Camb.U.i.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.; N.H.M.; Oxon.B.; Oxon.R.; R.S.; S.K.i.; U.C.L.i.
- Par. S. Md. Ém. Mm.** Mémoires de la Société Médicale d'Émulation. Paris. 1797—1826. B.M.i.; Camb.U.; Glasg.P.S.i.; Glasg.U.i.; Oxon.B.; R.C.Surg.
- Par. S. Mth. Bl.** Bulletin de la Société Mathématique de France. Paris. 1873— B.M.; Camb.P.S.; Camb.U.; Edinb.R.S.; Math.S.; Oxon.R.; R.A.S.; R.S.
- Par. S. Phlm. Bl.** See **Par. Bl. S. Phlm.**
- Par. S. Phlm. Mm. Cent.** Mémoires publiés par la Société Philomathique à l'occasion du Centenaire de sa Fondation. Paris. 1888. B.M.; Edinb.R.S.; N.H.M.; R.A.S.; R.S.
- Par. S. Phlm. N. Bl.** Nouveau Bulletin des Sciences de la Société Philomathique de Paris. Paris. 1807—1813; 1825—26; 1832—33. B.M.i.; Camb.U.; Dub.T.C.; N.H.M.; P.O.i.; R.C.Surg.; R.S.; U.C.L.
- Par. S. Phlm. PV.** Extraits des Procès-Verbaux des Séances de la Société Philomathique. Paris. 1836—63. N.H.M.; R.S.
See **Par. Sé. S. Ps.**
- Par. S. Ps. Sé.** See **Par. Sé. S. Ps.**
- Par. T. Nauk Śc. Pam.** Pamiętnik Towarzystwa Nauk Ścisłych w Paryżu. Paris. 1871—82. B.M.; N.H.M.
- Par. Tr. S. Amat.** Notices des Travaux de la Société des Amateurs des Sciences physiques et naturelles de Paris. Paris. 1807—08.
- Perpignan Mm. S. Ag. Pyr. Orient.** Société Agricole, Scientifique, et Littéraire des Pyrénées-Orientales. [Mémoires.] Perpignan. 1863. Glasg.P.S.i.
- Peterm. Mt.** Mittheilungen aus Justus Perthes' Geographischer Anstalt über wichtige neue Erforschungen auf dem Gesamtgebiete der Geographie; Petermann. Gotha. 1855— B.M.; Camb.U.; Dub.R.C.S.; Geol.M.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.; M.O.i.; N.H.M.i.; Oxon.B.; Oxon.R.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Pfaff Mt.** Mittheilungen [Practische und kritische Mittheilungen] aus dem Gebiete der Medicin, Chirurgie, und Pharmacie; Pfaff. Kiel, Altona. 1832—41. Glasg.P.S.i.; R.C.Surg.; R.S.
- Pfäg. Arch. Pl.** Archiv für die gesammte Physiologie des Menschen und der Thierte; Pfüger. Bonn. 1868— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Edinb.U.; Glasg.U.i.; N.H.M.i.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Philad. Ac. Nt. Sc. J.** ... Journal of the Academy of Natural Sciences of Philadelphia. Philadelphia. 1817— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; Edinb.U.i.; Geol.S.i.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.C.Surg.i.; R.S.i.; S.K.i.
See **Philad. J. Ac. Nt. Sc.**

List of Serial Publications

- Philad. Ac. Nt. Sc. F.** ... Proceedings of the Academy of Natural Sciences of Philadelphia. Philadelphia.
1841— B.M.i.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.i.; Edinb.R.S.; Geol.S.; Glasg.P.S.; Linn.S.i.; N.H.M.; Oxon.R.; P.O.i.; R.A.S.i.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- Philad. Coll. Phm. J.** Journal of the Philadelphia College of Pharmacy. Philadelphia.
1830—35. [Continued as: American Journal of Pharmacy, 1836—]
Glasg.P.S.; Pharm.S.; R.C.Surg.
- See **Philad. J. Coll. Phm.**
- Philad. J. Ac. Nt. Sc.** ... See **Philad. Ac. Nt. Sc. J.**
- Philad. J. Coll. Phm.** See **Philad. Coll. Phm. J.**
- Philad. Md. Ps. J.** See **Philad. Coll. Phm. J.**
- Philad. T.** Transactions of the American Philosophical Society. Philadelphia.
1771— B.M.i.; Camb.P.S.; Camb.U.i.; Chem.S.i.; Dub.R.I.A.i.; Edinb.R.S.; Geol.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.i.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- See **Am. Ph. S. T.**
- Phil. Trans.** Philosophical Transactions of the Royal Society of London. London.
1665— B.M.; Camb.P.S.i.; Camb.U.; Chem.S.i.; Dub.R.C.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.i.; Glasg.P.S.; Glasg.U.i.; I.CE.i.; Linn.S.i.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.i.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- Phm. CB.** Pharmaceutisches Central-Blatt. Leipzig.
1830—49. [Continued as: Chemisch-pharmaceutisches Central-Blatt, 1850—55.] B.M.; Chem.S.i.; Glasg.P.S.i.; Pharm.S.i.; P.O.; R.S.; U.C.L.i.
- Ph. Mg.** The Philosophical Magazine, or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science. London.
1827—32. [Continuation of: The Philosophical Magazine...; Tilloch, 1798—1826.]
The London, Edinburgh [and Dublin] Philosophical Magazine and Journal of Science. London.
1832— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.M.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.; Linn.S.i.; Math.S.i.; M.O.i.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Phm. J.** The Pharmaceutical Journal and Transactions. London.
1841— B.M.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Dub.T.C.i.; Glasg.P.S.; Glasg.U.i.; I.CE.i.; N.H.M.; Oxon.B.; Oxon.B.(R.); Pharm.S.; R.C.Surg.; R.S.i.; S.K.i.; U.C.L.
- Phm. Z. Russl.** Pharmaceutische Zeitschrift für Russland. St Petersburg.
1862— B.M.; P.O.
- See **Russl. Phm. Z.**
- Phot. J.** The Photographic Journal, including the Transactions of the Photographic Society of Great Britain. London.
1877— [Continuation of: The Journal of the Photographic Society of London, 1854—76.] B.M.; Camb.U.i.; Chem.S.; Dub.T.C.i.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.; I.CE.i.; Oxon.B.; Pharm.S.i.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.i.
- Ph. Stud.** Philosophische Studien herausgegeben von Wilhelm Wundt. Leipzig.
1883— Camb.U.; Dub.T.C.; Edinb.U.; Glasg.U.; Oxon.B.; R.S.; U.C.L.
- Pht. Arch.** Photographisches Archiv; Journal des allg. Deutschen Photographen-Vereins. Elberfeld.
1860—97. B.M.; Glasg.P.S.i.; P.O.
- Pht. Mh.** Photographische Monatshefte. Braunschweig.
1862—64. B.M.; Glasg.P.S.i.
- Pht. S. J.** Journal of the Photographic Society of London. London.
1853—76. [Continued as: The Photographic Journal, 1877—]
B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.i.; I.CE.i.; Oxon.B.; Pharm.S.; P.O.; R.A.S.; R.S.; S.K.

List of Serial Publications

- Pisa A. Un. Tosc.** { Annali delle Università Toscane. (Parte 2da.) Scienze Cosmo-
logiche. Pisa.
Pisa A. Un. Tosc. Sc. 1846— Camb.U.i.; N.H.M.; R.S.i.; S.K.i.
Cosm. Miscellanea medico-chirurgico-farmacentiche raccolte in Pisa. Pisa.
Pisa Misc. Md. Chir. 1843—44. Glasg.P.S.i.; Oxon.B.
Pisa N. G. Nuovo Giornale de' Letterati. Pisa.
1822—39. B.M.; Camb.U.; Oxon.B.
Pisa S. Tosc. At. (Mm.)... Atti della Società Toscana di Scienze Naturali residente in Pisa.
Memorie. Pisa.
1875— B.M.; Camb.P.S.i.; Dub.R.I.A.; Geol.S.; N.H.M.; R.S.
Pisa S. Tosc. At. (PV.)... Atti della Società Toscana di Scienze Naturali residente in Pisa.
Processi Verballi. Pisa.
1875— B.M.; Camb.P.S.i.; Dub.T.C.; Geol.S.i.; N.H.M.; R.S.
Pistoja At. Ac. Atti della R. Accademia Pistoiese di Scienze, Lettere ed Arti:
Memorie di Matematica e Fisica, per l'anno 1816. Pistoja.
1816. B.M.; Camb.U.; N.H.M.; Oxon.B.; R.S.
Pliste. Rs. Le Physiologiste Russe. Moscou.
1898— Glasg.P.S.i.; R.S.; U.C.L.i.
Plym. I. T. Annual Reports and Transactions of the Plymouth Institution and
Devon and Cornwall Natural History Society. Plymouth.
1855— Camb.U.i.; Dub.N.L.I.i.; Edinb.R.S.i.; Linn.S.i.; N.H.M.;
Oxon.B.i.; R.S.; S.K.; U.C.L.i.
Pogg. A. Annalen der Physik und Chemie; Poggendorff, Wiedemann.
Leipzig.
1824—99. [Continuation of: Annalen der Physik; Gilbert, 1799—
1824.] [Continued as: Annalen der Physik; Drude, 1900—]
B.M.; Camb.P.S.i.; Camb.U.; Chem.S.; Dub.R.I.A.; Dub.T.C.;
Edinb.R.S.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; N.H.M.;
Oxon.B.(R.); Pharm.S.i.; P.O.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
See A. Ps. C.
Poligrafo Il Poligrafo: Giornale di Scienze, Lettere ed Arti; Orti. Verona.
1830—45. B.M.; Oxon.B.
Polli A. Annali di Chimica; Polli. Milano.
1845—97. [Continued as: Annali di Farmacoterapia e Chimica,
1898—] B.M.; Camb.U.i.; Chem.S.i.; Pharm.S.i.; P.O.i.
See A. di C.
Pollich. Jahresbericht der Pollichia, eines Naturwissenschaftlichen Vereins
der Rheinpfalz. Dürkheim a. d. Haardt.
1843— Camb.U.; Linn.S.; N.H.M.; R.S.i.
Pol. Mt. Polytechnische Mittheilungen, unter Mitwirkung von Professoren
höherer technischer Lehranstalten. Tübingen.
1844—46. B.M.; R.S.
Pop. As. Popular Astronomy. Northfield, Minnesota.
1894— B.M.; Glasg.U.; R.A.S.; S.K.
Pop. Sc. Rv. The Popular Science Review: a Quarterly Miscellany of enter-
taining and instructive articles on Scientific Subjects; Samuelson.
London.
1861—81. B.M.; Camb.U.; Dub.R.D.S.; Dub.T.C.; Edinb.U.i.;
Geol.M.; Geol.S.i.; Glasg.U.i.; I.CE.; Linn.S.; N.H.M.;
Oxon.B.; Oxon.R.i.; Pharm.S.i.; P.O.; R.C.Surg.; R.S.i.; S.K.
Portugal Trab. Gl. Com. Comunicações da Comissão dos Trabalhos Geologicos de Portugal.
Lisboa.
1883—92. [Continued as: Comunicações da Direcção, etc., 1895—]
B.M.; Camb.P.S.; Geol.M.; Geol.S.; Glasg.P.S.i.; N.H.M.;
Oxon.R.i.; R.S.
Prace Mt.-Fiz. Prace Matematyczno-Fizyczne. Warsaw.
1888— Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.i.; Math.S.;
R.S.i.
Practit. The Practitioner. London, Paris, New York, Melbourne.
1868— B.M.; Camb.U.; Edinb.U.; Glasg.U.i.; Oxon.B.; Pharm.S.i.;
R.C.Surg.
Prag Ab. Abhandlungen der k. Böhmischen Gesellschaft der Wissenschaften.
Prag.
1785—1892. B.M.i.; Camb.P.S.; Camb.U.i.; Dub.R.I.A.i.; Edinb.
R.S.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.; R.C.Surg.i.;
R.S.i.; S.K.i.
See Böhm. Gs. Ab.

List of Serial Publications

- Prag České Ak. Fr. Jos. Pam.** Památník na oslavu padesátiletého panovnického jubilea jeho veličenstva císaře a krále Františka Josefa I. Vydala Česká Akademie Císaře Františka Josefa pro Vědy, Slovesnost a Umění. [Memoirs in honour of the jubilee of his Imperial and Royal Majesty Franz Joseph I. Edited by the Imperial Bohemian Franz-Joseph Academy of Sciences, Literature and Art.] Praze (Prag).
1898. Camb.P.S.; N.H.M.
- Prag České Ak. Fr. Jos. Rz.** Rozprawy České Akademie Císaře Františka Josefa pro Vědy, Slovesnost a Umění. [Memoirs of the Imperial Bohemian Franz-Joseph Academy of Sciences, Literature and Art.] Prag.
1891— B.M.; Edinb.R.S.; N.H.M.i.; U.C.L.i.
- Prag Fr. Jos. Ac. Sc. Bl. (Mth. Nt.)** Académie des Sciences de l'Empereur François Joseph I (Česká Akademie Císaře Františka Josefa I). Bulletin International. Résumé des Travaux présentés. Sciences Mathématiques et Naturelles. Prag.
1897— Edinb.R.S.; N.H.M.i.
- Prag Sb.** Sitzungsberichte der k. böhmischen Gesellschaft der Wissenschaften in Prag. Prag.
1859— Camb.P.S.; Camb.U.i.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.i.; Linn.S.i.; N.H.M.; R.S.; S.K.; U.C.L.i.
- Prag Vjschr.** Vierteljahrschrift für die praktische Heilkunde; herausg. von der Medicinischen Facultät in Prag. Prag.
1844—79. [Continued as: Zeitschrift für Heilkunde, 1880—] B.M.; Camb.U.i.; Glasg.P.S.i.; R.C.Surg.
- Presburg Vh.** Verhandlungen des Vereins für Naturkunde zu Presburg. Presburg.
1856— B.M.; Camb.U.; Geol.S.i.; Glasg.P.S.i.; Linn.S.i.; N.H.M.; R.S.i.
- Presse Sc.** Presse Scientifique des Deux Mondes. Paris.
1860—66. B.M.; R.S.i.
- Ps. Mdd.** Physikalske Meddelelser; Arndtsen. Christiania.
1858.
- Ps. Rv.** The Physical Review. New York, London, Berlin.
1894— B.M.; Camb.P.S.; Camb.U.; Dub.R.C.S.; Edinb.R.S.; Edinb.U.i.; Glasg.U.; Oxon.R.; P.O.; R.S.; S.K.
- Ps. Z.** Physikalische Zeitschrift. Leipzig.
1899— Camb.P.S.; Edinb.U.; Glasg.U.; Oxon.R.; P.O.; R.S.; S.K.; U.C.L.i.
- Ptsd. Asps. Obs. Pb.** Publicationen des Astrophysikalischen Observatoriums zu Potsdam. Potsdam.
1878— B.M.; Camb.U.; Dub.R.D.S.; Oxon.R.; R.A.S.; R.S.
- Pulk. Obs. Pb.** Publications de l'Observatoire Central Nicolas. St.-Petersbourg.
1893— [Continuation of: Observations de Poulkova, 1869—91.] Camb.P.S.; Dub.R.I.A.; Edinb.R.S.i.; Glasg.P.S.i.; R.A.S.; R.S.i.
- QJ. Mcr. Sc.** Quarterly Journal of Microscopical Science; Lankester and Busk. London.
1853— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.N.L.I.; Dub.R.C.S.; Edinb.R.S.; Edinb.U.; Geol.S.i.; Glasg.P.S.; Glasg.U.; Linn.S.; N.H.M.; Oxon.B.i.; Oxon.R.; Pharm.S.; P.O.; R.C.Surg.; R.S.; S.K.; U.C.L.
- QJ. Mth.** See **J. Mcr. Sc. and Mcr. J.**
The Quarterly Journal of Pure and Applied Mathematics. London.
1855— B.M.; Camb.P.S.; Camb.U.; Dub.N.L.I.; Dub.T.C.; Edinb.R.S.i.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; L.C.E.i.; Math.S.i.; Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.S.; S.K.; U.C.L.
- QJ. Sc.** The Journal of Science and the Arts; edited at the Royal Institution of Great Britain. London.
1816—19.
Quarterly Journal of Science, Literature and Arts. London.
1819—30. B.M.; Camb.U.; Chem.S.; Dub.T.C.; Edinb.R.S.; Glasg.U.i.; L.C.E.; Oxon.B.; Oxon.R.; Pharm.S.; R.C.Surg.; R.S.; S.K.; U.C.L.
- QJ. Sc.** The Quarterly Journal of Science [and Annals of Mining...]. London.
1864—78. [Continued as: The Journal of Science, etc., 1879—85.] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Edinb.R.S.;

List of Serial Publications

- Edinb.U.; Glasg.U.; I.CE.i.; Linn.S.i.; M.O.i.; N.H.M.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.; R.C.Surg.; R.S.; S.K.
Queensl. R. S. P...... The Proceedings of the Royal Society of Queensland. Brisbane.
 1884— B.M.; Camb.P.S.; Dub.R.I.A.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; I.CE.i.; Linn.S.i.; N.H.M.; Oxon.B.; P.O.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.
Quek. Micr. Cl. J...... Journal of the Quekett Microscopical Club. London.
 1868— B.M.; Camb.U.; Dub.R.D.S.; Geol.S.i.; Linn.S.i.; N.H.M.; Oxon.B.(R.); P.O.; R.S.; S.K.; U.C.L.
Quetelet Cor. Mth...... Correspondance Mathématique et Physique; publiée par MM. Garnier et Quetelet. Gand, Bruxelles.
 1825—39. B.M.; Camb.U.; R.A.S.i.; R.S.; U.C.L.
Railroad & Eng. J...... The Railroad and Engineering Journal. New York.
 1887—92. [Continuation of: Van Nostrand's Engineering Magazine, 1869—85.] [Continued as: American Engineer and Railroad Journal, 1893—] B.M.; I.CE.; P.O.
Ranuzzi An. Gg...... Annuario geografico Italiano; Ranuzzi. Bologna.
 1844—45. B.M.; Camb.U.; R.Geogr.S.
Rass. Sc. Gl. It...... Rassegna delle Scienze Geologiche in Italia. Roma.
 1892. B.M.i.; Camb.U.; Geol.M.i.; N.H.M.i.; R.S.i.; U.C.L.
Rch. Chron...... Recherches Chronométriques; publiées sous la direction du Ministre de la Marine. Paris.
 1854— R.S.i.
Reclam Kosmos..... Kosmos: Zeitschrift für angewandte Naturwissenschaften; Reclam. Leipzig.
 1857—60. B.M.; R.A.S.i.
Rec. Mth. (Moscou)..... Recueil mathématique. Publié par la Société Mathématique de Moscou. [In Russian.] Moscou.
 1866— R.S.
Rec. Tr. C. F.-Bas..... Recueil des Travaux Chimiques des Pays-Bas [et de la Belgique]. Leide.
 1882— Camb.P.S.; Chem.S.; P.O.; S.K.
Reichert Arch...... Archiv für Anatomie, Physiologie, und Wissenschaftliche Medicin; Müller, Reichert, Du Bois-Reymond. Berlin.
 1834—76. [Continuation of: Archiv für Anatomie und Physiologie, 1826—32.] [Continued as: Archiv für Anatomie und Physiologie, 1877—] B.M.; Camb.U.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.
 See **Arch. An. Pl. and Müller Arch.**
Reims A. Ac...... Annales de l'Académie de Reims. Reims.
 1842—43. [Continued as: Séances etc., 1844—] B.M.; Glasg.P.S.i.; N.H.M.; Oxon.B.; R.S.
Reims Sé. Ac...... Séances et Travaux de l'Académie de Reims. Reims.
 1844— [Continuation of: Annales, etc., 1842—43.] B.M.i.; N.H.M.i.; Oxon.B.
Rép. C. Appl...... Répertoire de Chimie appliqué. Paris.
 1859—63. Camb.U.; Chem.S.; Glasg.P.S.i.; N.H.M.; Pharm.S.i.; R.S.
R. E. Pp...... Papers on subjects connected with the duties of the Corps of Royal Engineers. London.
 1843— Camb.U.; Geol.M.i.; I.CE.; P.O.i.; S.K.i.
Rheinl. Westphal. Sb...... Sitzungsberichte der Niederrheinischen Gesellschaft für Natur- und Heilkunde zu Bonn. Bonn.
 1854— B.M.i.; Camb.U.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; Oxon.R.; R.S.i.; S.K.
 See **Bonn Niedr. Gs. Sb.**
Rheinl. Westphal. Vh...... Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlande, Westfalens und des Reg.-Bezirks Osnabrück. Bonn.
 1844— B.M.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Geol.S.i.; Linn.S.i.; N.H.M.; Oxon.R.; R.C.Surg.i.; R.S.i.; S.K.
 See **Bonn NH. Vr. Vh. and Bonn Vh. NH. Vr.**
Riga Arb. Nf. Vr...... Arbeiten des Naturforschenden Vereins in Riga. Rudolstadt.
 1848. Camb. U.; Glasg.P.S.i.; N.H.M.; R.S.
Riga Cor.-Bl...... Correspondenzblatt des Naturforscher-Vereins zu Riga. Riga.
 1846— B.M.; Dub.R.I.A.i.; N.H.M.; R.S.i.
R. I. J...... Journal of the Royal Institution of Great Britain. London.

List of Serial Publications

- 1802—03; 1830—31. Camb.U.i.; Chem.S.i.; Dub.R.D.S.; Edinb. R.S.i.; Geol.S.i.;^{*} Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.i.; Oxon.R.; Pharm.S.i.; P.O.i.; R.A.S.i.; R.C.Surg.; R.S.; S.K.i.; U.C.L.i.
- Rio Obs. Rv.** Revista do Observatorio. Publicação Mensal do Imperial Observatorio do Rio de Janeiro. Rio de Janeiro.
- 1886—91. Dub.R.D.S.i.; Edinb.R.S.i.; M.O.; R.A.S.; R.S.
- R. I. P.** Notice of the Proceedings at the meetings of the members of the Royal Institution, with Abstracts of the Discourses delivered at the Evening Meetings. London.
- 1851— B.M.; Camb.U.; Chem.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.i.; Linn.S.; M.O.; N.H.M.; Oxon.R.; Pharm.S.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Rm. At.** (Atti dell' Accademia Pontificia de' Nuovi Lincei. Roma.
- Rm. At. N. Linc.** 1847— B.M.; Dub.R.I.A.; Edinb.R.S.; Glasg.U.i.; I.CE.i.; N.H.M.; Oxon.B.i.; R.A.S.i.; R.Geogr.S.i.; R.S.
- See **Rm. N. Linc. At.**
- Rm. At. R. Ac.** Atti della Reale Accademia dei Lincei. Roma.
- 1870—83. B.M.; Camb.P.S.; Camb.U.i.; Chem.S.i.; Dub.R.D.S.; Dub.R.I.A.; Glasg.U.i.; Linn.S.; Math.S.i.; N.H.M.; Oxon.B.; Oxon.R.i.; R.A.S.i.; R.Geogr.S.; R.S.; S.K.i.; U.C.L.i.
- See **Rm. R. Ac. Linc. At.**
- Rm. Bul. Met.** Bullettino Meteorologico dell' Osservatorio del Collegio Romano. Roma.
- 1862—78. [Continued as: Pontificia Università Gregoriana, 1879—] Edinb.R.S.i.; Glasg.P.S.i.; M.O.; R.A.S.; R.S.; U.C.L.i.
- Rm. Cor. Sc.** Corrispondenza Scientifica in Roma per l'avanzamento delle Scienze, etc. Roma.
- 1848—69.
- See **Rm. Sc. Cor.**
- Rm. N. Linc. At.** See **Rm. At.**
- Rm. N. Linc. Mm.** Memorie della Pontificia Accademia dei Nuovi Lincei. Roma.
- 1887— Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; N.H.M.; R.S.
- Rm. R. Ac. Linc. At.** See **Rm. At. R. Ac.**
- Rm. R. Ac. Linc. Mm.** Atti della R. Accademia dei Lincei. Memorie della Classe di Scienze fisiche, matematiche e naturali. Roma.
- 1877— B.M.i.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.i.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.i.; Linn.S.; Math.S.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.A.S.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Rm. R. Ac. Linc. Rd.** Atti della R. Accademia dei Lincei. Rendiconti. Roma.
- 1885— [Continuation of: Transunti, 1877—84.] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.T.C.; Edinb.R.S.; Geol.S.; Glasg.U.; I.CE.i.; Linn.S.; Math.S.; N.H.M.; Oxon.B.; Oxon.R.; R.A.S.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Rm. R. Ac. Linc. T.** Atti della R. Accademia dei Lincei. Transunti. Roma.
- 1877—84. [Continued as: Rendiconti, 1885—] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.; Edinb.R.S.; Geol.S.; Glasg.P.S.i.; Glasg.U.; I.CE.i.; Linn.S.; Math.S.; N.H.M.; Oxon.B.; Oxon.R.; R.A.S.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Rm. Sc. Cor.** See **Rm. Cor. Sc.**
- Rm. S. It. Mm.** Memorie di Matematica e di Fisica della Società Italiana delle Scienze. Napoli, Roma.
- 1782— B.M.i.; Camb.P.S.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.i.; Glasg.U.i.; Linn.S.i.; Oxon.B.i.; R.A.S.i.; R.C.Surg.i.; R.S.; S.K.i.; U.C.L.i.
- See **Mod. Mm. S., Mod. S. It. Mm., and Verona Mm. S. It.**
- Rm. Spec. Vat. Pb.** Pubblicazioni della Specola Vaticana. Roma, Torino.
- 1891— Glasg.U.i.; M.O.; R.A.S.; R.S.
- Rm. Off. Centr. Met. A.** Annali dell' Ufficio Centrale di Meteorologia Italiana [Ufficio Centrale Meteorologico e Geodinamico Italiano]. Roma.
- 1880— M.O.; R.A.S.i.
- Rob. J. An.** Journal de l'Anatomie et de la Physiologie normales et pathologiques de l'Homme et des Animaux; Robin. Paris.
- 1864— B.M.; Camb.P.S.i.; Camb.U.; Edinb.U.; Glasg.U.i.; N.H.M.i.; Oxon.B.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.i.

List of Serial Publications

- Rochester (N. Y.) Ac. Sc. P.**..... Proceedings of the Rochester Academy of Sciences. Rochester, N.Y. 1890— B.M.; Camb.P.S.; Edinb.R.S.i.; Linn.S.; N.H.M.; R.S.; U.C.L.i.
- Roser u. Wunderlich Arch.**..... Archiv für Physiologische Heilkunde; Roser, Wunderlich, Griesinger. Stuttgart. 1842—59. [*Continued as:* Archiv der Heilkunde, 1860—78.] B.M.; Camb.U.; Glasg.P.S.i.; Oxon.R.i.; R.C.Surg.; R.S.; U.C.L.
- Rot. N. Vh.**..... Nieuwe Verhandelingen van het Bataafsch Genootschap der Proefondervindelijke Wijsbegeerte te Rotterdam. Rotterdam. 1800— B.M.i.; Camb.U.i.; Chem.S.i.; Dub.R.D.S.; Edinb.R.S.i.; Glasg.U.i.; I.CE.i.; Oxon.B.; R.C.Surg.i.; R.S.
- Rouen Ac. Tr.**..... Précis analytique des Travaux de l'Académie des Sciences, Belles-Lettres, et Arts de Rouen. Rouen. 1804— B.M.; Camb.U.; Dub.R.I.A.; Dub.T.C.; N.H.M.i.; Oxon.B.; R.S.i.
See Rouen Tr. Ac.
- Rouen Bil. S. Ém.**..... Bulletins [des travaux] de la Société Libre d'Émulation de Rouen. Rouen. 1837— B.M.; Oxon.B.
- Rouen S. Sc. Bil.**..... Bulletin de la Société des Amis des Sciences Naturelles de Rouen. Rouen. 1875— B.M.; Glasg.P.S.i.; N.H.M.
See Rouen Ac. Tr.
- Roum. I. Mét. A.**..... Annales de l'Institut Météorologique de Roumanie. Bucarest, Paris. 1886— B.M.i.; Edinb.R.S.; M.O.; R.Geogr.S.i.; R.S.i.
- Rpm. Anal. C.**..... Repertorium der Analytischen Chemie für Handel, Gewerbe und Öffentliche Gesundheitspflege. Hamburg, Leipzig. 1881—87. [*Continued as:* Zeitschrift für die Chemische Industrie, 1887.] Chem.S.; P.O.
- Rpm. Mth.**..... Repertorium der literarischen Arbeiten aus dem Gebiete der reinen und angewandten Mathematik. Leipzig. 1877—79. Camb.U.; R.S.
- Rpm. Phm.**..... Repertorium für die Pharmacie; Gehlen. Nürnberg. 1815—51. B.M.; Camb.U.; Edinb.U.; Pharm.S.; R.C.Surg.; R.S.
- Rpm. Ps.**..... Repertorium der Physik. Enthaltend eine vollständige Zusammenstellung der neuern Fortschritte dieser Wissenschaft. Berlin. 1837—49. Chem.S.; Glasg.P.S.i.; P.O.; R.S.; S.K.; U.C.L.
- Rs. C. Ps. S. J.**..... Journal of the Russian Chemical Society and of the Physical Society of the Imperial University of St. Petersburg. [In Russian.] St. Petersburg. 1873—78. [*Continuation of:* Journal of the Russian Chemical Society, 1869—72.] [*Continued as:* Journal of the Russian Physico-Chemical Society, etc., 1879—] Camb.P.S.i.; Chem.S.; Edinb.R.S.i.; N.H.M.
- Rs. C. S. J.**..... Journal of the Russian Chemical Society. [In Russian.] St. Petersburg. 1869—72. [*Continued as:* Journal of the Russian Chemical Society and of the Physical Society of the Imperial University of St. Petersburg, 1873—78.] Camb.P.S.i.; Chem.S.; Edinb.R.S.i.; Glasg.P.S.i.; N.H.M.
- R. S. P.**..... Abstracts of the papers printed in the Philosophical Transactions of the Royal Society of London from 1800 to 1843. London. 1832—43.
Abstracts of the papers communicated to the Royal Society of London from 1843 to 1854. London. 1851—54.
Proceedings of the Royal Society of London. London. 1856— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Dub.R.C.S.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.; Linn.S.i.; Math.S.i.; M.O.; N.H.M.; Oxon.B.i.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.; R.C.Surg.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Rs. Ps.-C. S. J.**..... Journal of the Russian Physico-Chemical Society of the Imperial University of St Petersburg. [In Russian.] St Petersburg. 1879— [*Continuation of:* Journal of the Russian Chemical Society, etc., 1869—78.] Camb.P.S.i.; Chem.S.; Edinb.R.S.i.; N.H.M.
- R. S. Yearbook**..... Yearbook of the Royal Society of London. (Biography 1900.)

List of Serial Publications

- Rugby NH. S. Rp.** Reports of the Rugby School Natural History Society. Rugby.
1867— Geol.S.i.; M.O.; N.H.M.; R.A.S.; S.K.i.
- Russl. Phm. Z.** Pharmaceutische Zeitschrift für Russland. St. Petersburg.
1862— B.M.; P.O.
See Phm. Z. Russl.
- Rv. Artl.** Revue d'Artillerie. Paris, Nancy.
1872— B.M.; I.CE.; P.O.
- Rv. Brazil.** Revista Brasileira, Jornal de Ciencias, Lettras e Artes; Oliveira.
Rio de Janeiro.
1857—61. B.M.; N.H.M.; R.S.i.
- Rv. Bt.** Revue de Botanique. Bulletin Mensuel de la Société Française de
Botanique. Courrensan, Toulouse.
1882—95. Glasg.P.S.i.; N.H.M.; Pharm.S.i.
- Rv. Cours Sc.** Revue des Cours Scientifiques de la France et de l'Étranger; Eug.
Yung et Ém. Algrave. Paris.
1867—70. [*Continued as:* Revue Scientifique, etc., 1871—] B.M.;
Edinb.R.S.i.; Edinb.U.; N.H.M.; Oxon.R.; P.O.; R.C.Surg.;
R.S.; S.K.
- Rv. Gén. Bt.** Revue Générale de Botanique. Paris.
1889— B.M.; Camb.U.; Glasg.P.S.i.; Glasg.U.; Linn.S.; N.H.M.;
S.K.; U.C.L.
- Rv. Gg. It.** Rivista Geografica Italiana. Roma.
1893— B.M.; Glasg.P.S.i.; R.Geogr.S.
- Rv. It. Sc. Nt. Siena** Rivista Italiana di Scienze Naturali. Siena.
1889— [*Continuation of:* Bollettino del Naturalista, 1881—88.]
Glasg.P.S.i.; N.H.M.
- Rv. Mar.** (Revue maritime et coloniale. Paris.
- Rv. Mar. et Col.** 1861— B.M.; I.CE.i.; M.O.i.; Oxon.B.; P.O.; R.Geogr.S.i.
- Rv. Mn. Cr.** Rivista di Mineralogia e Cristallografia Italiana. Padova.
1887— B.M.; Camb.U.; Geol.M.; Geol.S.; N.H.M.; S.K.
- Rv. Mt.** Rivista di Matematica. Torino.
1891—95. [*Continued as:* Revue de Mathématiques, 1896—]
Camb.U.; Oxon.B.; R.S.
- Rv. Mth.** Revue de Mathématiques. Turin.
1896— [*Continuation of:* Rivista di Matematica, 1891—95.]
Camb.U.; Oxon.B.; R.S.
- Rv. Quest. Sc.** Revue des Questions Scientifiques, publiée par la Société Scientifique
de Bruxelles. Louvain, Paris.
1877— B.M.; N.H.M.; S.K.i.
- Rv. Sc.** Revue scientifique et industrielle; Quesneville. Paris.
1840—52. B.M.; Camb.U.; Chem.S.i.; Oxon.B.i.; S.K.
- Rv. Sc.** La Revue Scientifique de la France et de l'Étranger. Paris.
1871— [*Continuation of:* Revue des Cours Scientifiques, etc.,
1863—70.] B.M.; Camb.U.; Edinb.R.S.; Edinb.U.; Geol.S.;
N.H.M.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.; R.S.; S.K.
- Rv. Sc.-Ind.** Rivista Scientifico-Industriale delle principali scoperte ed invenzioni
fatte nelle scienze e nelle industrie. Firenze.
1869— P.O.
- Rv. Sper. Freniatr.** Rivista Sperimentale di Freniatria e di Medicina legale. Reggio-
Emilia.
1875— R.C.Surg.
- Rv. Trim. Mcgr.** Revista Trimestral Micrográfica. Organó del Laboratorio Histológico
de la Facultad de Medicina de Madrid. Madrid.
1896— R.S.
- Rv. Un. Mines** Revue Universelle des Mines, de la Métallurgie, etc.; de Cuyper.
Paris, Liège.
1857— B.M.; Camb.U.; Dub.R.I.A.i.; Glasg.P.S.i.; Glasg.U.i.;
I.CE.i.; N.H.M.; P.O.; S.K.
See Cuyper Rv. Un.
- S. Afr. C. Mtl. S. J.** The Journal of the Chemical and Metallurgical Society of South
Africa. Johannesburg.
1898— Camb.P.S.; Chem.S.; Glasg.P.S.i.; P.O.; S.K.i.
- S. Afr. C. Mtl. S. P.** The Proceedings of the Chemical and Metallurgical Society of South
Africa. Johannesburg, Edinburgh, New York.
1894— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Glasg.P.S.i.; P.O.;
S.K.

List of Serial Publications

- S. Afr. Ph. S. T.** The Transactions of the South African Philosophical Society. Cape Town.
1878— B.M.; Camb.P.S.; Camb.U.i.; Chem.S.; Edinb.R.S.; Edinb.U.; Glasg.P.S.; I.CE.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.
- S. Afr. QJ.** The South African Quarterly Journal; edited at the African Institution. Cape Town.
1830—35. B.M.i.; Edinb.R.S.i.; N.H.M.; R.Geogr.S.i.
- Santiago de Chile Un. A.** Anales de la Universidad de Chile. Santiago de Chile.
1843— B.M.i.; Dub.T.C.; Glasg.U.i.; N.H.M.i.; Oxon.B.i.; R.Geogr.S.i.
- Sarthe S. Bll.** Bulletin de la Société d'Agriculture, etc., de la Sarthe... Le Mans.
1833— R.S.i.
- S. Aust. R. S. T.** Transactions and Proceedings and Report of the Royal Society of South Australia. Adelaide.
1879— Camb.P.S.i.; Camb.U.i.; Chem.S.i.; Dub.R.I.A.i.; Edinb.R.S.; Geol.S.; I.CE.i.; Linn.S.i.; N.H.M.; P.O.; R.A.S.; R.C.Surg.i.; R.Geogr.S.i.; R.S.i.
- Sav. Ac. Mm.** (Mémoires de la Société Académique de Savoie. Chambéry.
Sav. Mm. Ac. 1825— Camb.U.; Dub.R.I.A.; Dub.T.C.; N.H.M.; Oxon.B.; R.S.i. See **Chambéry Mm. Ac. Sav.**
- Sav. S. H. Nt. Bll.** Bulletin de la Société d'Histoire Naturelle de Savoie. Chambéry.
1850—53; 1887— Geol.S.i.; N.H.M.
- Sc. Abs.** Science Abstracts. Physics and Electrical Engineering. London.
1898— Camb.P.S.; Camb.U.; Chem.S.; Edinb.R.S.i.; Edinb.U.; Glasg.P.S.; I.CE.; Oxon.R.; P.O.; R.A.S.i.; R.S.; S.K.; U.C.L.
- Sc. Gg. Mg.** The Scottish Geographical Magazine. Edinburgh.
1885— B.M.; Camb.U.; Dub.T.C.i.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.i.; M.O.; N.H.M.; Oxon.B.; R.Geogr.S.; U.C.L.
- Schelling N. Z. Spec. Ps.** Neue Zeitschrift für speculative Physik; Schelling. Tübingen.
1802. [Continuation of: Zeitschrift, 1800—01.] B.M.; Glasg.P.S.i.; R.S.
- Schelling Z. Spec. Ps.** ... Zeitschrift für speculative Physik; Schelling. Jena, Leipzig.
1800—01. [Continued as: Neue Zeitschrift, 1802.] B.M.; Camb.U.; Oxon.B.; R.S.
- Scherer J. C.** Allgemeines Journal der Chemie; Scherer. Leipzig.
1798—1802. [Continued as: Neues Allgemeines Journal etc., 1803—06.] B.M.; Glasg.P.S.i.; N.H.M.; R.S.
- Sch. Gs. N. D.** Neue Denkschriften der allgemeinen Schweizerischen Gesellschaft für die gesammten Naturwissenschaften. Neuchâtel, Zürich, etc.
1837— B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.; Geol.S.i.; Linn.S.i.; N.H.M.; Oxon.B.; R.C.Surg.i.; R.S.; S.K.
See **Zür. N. D. Sch. Gs.**
- Sch. Gs. Vh.** Verhandlungen der Schweizerischen Gesellschaft für die gesammten Naturwissenschaften. Aarau, etc.
1823— B.M.i.; Edinb.R.S.i.; Geol.S.i.; Glasg.U.i.; Linn.S.i.; N.H.M.; R.C.Surg.i.; R.S.; S.K.
See **Act. S. Helv., At. S. Elvet. and Sch. Nf. Gs. Vh.**
- Schl.-Holst. Nt. Vr. Schr.** Schriften des Naturwissenschaftlichen Vereins für Schleswig-Holstein. Kiel.
1873— B.M.; Camb.U.; Edinb.R.S.i.; Linn.S.; N.H.M.; R.S.i.
- Schlömilch Z.** Zeitschrift für Mathematik und Physik; Schlömilch. Leipzig.
1856— B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.D.S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.U.; Glasg.U.i.; Math.S.i.; Oxon.B.(R.); R.S.; S.K.; U.C.L.i.
See **Z. Mth. Ps.**
- Sch. Mines Q. N. Y.** The School of Mines Quarterly. New York.
1879— B.M.i.; Glasg.P.S.; I.CE.i.; N.H.M.; P.O.; S.K.i.
- Sch. Nf. Gs. Vh.** See **Act. S. Helv., At. S. Elvet. and Sch. Gs. Vh.**
- Sch. Pol. Z.** Schweizerische polytechnische Zeitschrift; Bolley. Winterthur.
1856—70. B.M.; I.CE.; P.O.; R.Geogr.S.i.
- Schröder B. Zeev.** Berigten en Verhandelingen over eenige onderwerpen des Zeevaarts; Schröder. Amsterdam.
1823—25. B.M.; Glasg.P.S.i.

List of Serial Publications

- Schumacher As. Ab.**..... Astronomische Abhandlungen; Schumacher. Altona.
1823—25. B.M.; Camb.U.; Dub.R.D.S.; Edinb.R.S.; R.A.S.; R.S.
- Schumacher Jb.**..... Jahrbuch (astronomisches); Schumacher. Stuttgart, Tübingen.
1836—44. Camb.U.; Edinb.R.S.i.; Oxon.R.i.; R.A.S.; R.S.i.; U.C.L.
- Schwäb. Gs. D.**..... Denkschriften der Schwäbischen Gesellschaft der Aerzte und Naturforscher. Tübingen.
1805. N.H.M.; R.S.; S.K.
- Schweigger J.**..... Journal für Chemie und Physik; Schweigger. Nürnberg.
1811—33. B.M.; Chem.S.i.; Edinb.R.S.; N.H.M.; Oxon.R.; P.O.; R.C.Surg.; R.S.i.; S.K.
- Science** Science. Cambridge, Mass., and New York.
1883— B.M.; Camb.P.S.i.; Dub.N.L.I.i.; Dub.R.C.S.i.; Edinb.R.S.; Edinb.U.i.; Geol.S.i.; Glasg.P.S.i.; I.CE.i.; N.H.M.; Oxon.R.i.; P.O.; R.A.S.i.; R.Geogr.S.; S.K.
- S. C. In. J.**..... The Journal of the Society of Chemical Industry. Manchester, London.
1882— Camb.U.; Chem.S.; Dub.N.L.I.; Dub.R.C.S.; Dub.R.D.S.; Edinb.R.S.i.; Edinb.U.i.; Geol.M.i.; Glasg.U.i.; I.CE.; Oxon.R.i.; Pharm.S.; P.O.; R.S.; S.K.; U.C.L.
- Sc. Micr. S. P. & T.** Proceedings and Transactions of the Scottish Microscopical Society. Edinburgh.
1889— Camb.P.S.; Dub.R.D.S.; Edinb.U.; Glasg.P.S.i.; Linn.S.; R.S.i.
- Sc. Met. S. J.** Journal of the Scottish Meteorological Society. Edinburgh, London.
1864— B.M.; Camb.U.; Dub.T.C.; Edinb.R.S.; Edinb.U.i.; Glasg.P.S.; Glasg.U.i.; M.O.; Oxon.B.; Oxon.R.i.; R.Geogr.S.i.; R.S.i.; S.K.i.
- Sc. S. Arts T.** Transactions of the Royal Scottish Society of Arts. Edinburgh.
1841— B.M.i.; Camb.U.; Dub.R.D.S.; Edinb.R.S.; Edinb.U.; Glasg.P.S.; Glasg.U.; I.CE.; P.O.; R.S.; S.K.
See Edinb. Sc. S. Arts P. and Edinb. T. Sc. S. Arts.
- S. Dyers Col. J.** The Journal of the Society of Dyers and Colourists. Bradford, Yorks.
1884— Chem.S.i.; Glasg.P.S.i.; P.O.; S.K.
- Seine-et-Oise Mm.**..... Mémoires de la Société des Sciences Naturelles de Seine et Oise. Versailles.
1835— B.M.; Camb.U.i.; N.H.M.; S.K.
- Seism. J. Jap.**..... Seismological Journal of Japan. Yokohama.
1893—95. [*Continuation of*: Transactions of the Seismological Society of Japan, 1880—92.] B.M.; Camb.U.i.; Dub.R.I.A.; Geol.M.; Geol.S.; I.CE.; R.A.S.i.; R.Geogr.S.; R.S.
- Senckb. Nf. Gs. B.**..... Bericht über die Senckenbergische Naturforschende Gesellschaft in Frankfurt am Main. Frankfurt a. M.
1868— B.M.; Camb.U.i.; Geol.S.i.; Linn.S.; N.H.M.; Oxon.R.; R.C.Surg.i.; R.S.
- S. Fernando Obs. Mar. A.**..... Anales del Instituto y Observatorio de Marina de San Fernando. San Fernando.
1883— Camb.P.S.i.; M.O.; R.A.S.; R.S.i.
- Sid. Mess.**..... The Sidereal Messenger. Northfield, Minn.
1883—91. [*Continued as*: Astronomy and Astrophysics, 1892—94.] B.M.; R.A.S.; S.K.i.
- Siena At. Ac.** Atti dell' Accademia delle Scienze di Siena detta de' Fisio-critici. Siena.
1761— B.M.; Camb.U.i.; Dub.R.I.A.i.; Dub.T.C.i.; N.H.M.i.; Oxon.B.; R.C.Surg.i.; R.S.i.
- Silliman J.** The American Journal of Science and Arts; Silliman. New Haven.
1818— B.M.; Camb.P.S.i.; Camb.U.; Chem.S.i.; Dub.N.L.I.i.; Dub.R.C.S.i.; Dub.T.C.i.; Edinb.R.S.; Edinb.U.; Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.
See Am. J. Sc.
- Sk. Nf. F.** { Förhandlingar vid det af Skandinaviska Naturforskare och Läkare
- Sk. Nt. Möt. F.** { hållna Môte..... Götheborg, etc.
- Sk. Nt. Möt. F.** { Förhandlingerne ved de Skandinaviske Naturforskeres...Møde....
Götheborg, etc.
1839— B.M.; N.H.M.; Oxon.B.i.; R.C.Surg.i.; R.S.i.

List of Serial Publications

- Smiths. Ct.** Smithsonian Contributions to Knowledge. Washington.
1848— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.T.C.; Edinb.
R.S.; Edinb.U.; Geol.M.i.; Geol.S.i.; Glasg.P.S.; Glasg.U.i.;
I.CE.; Linn.S.; M.O.i.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.i.;
R.A.S.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- Smiths. I. Asps. Obs. A.** Annals of the Astrophysical Observatory of the Smithsonian Institution. Washington.
1900— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Edinb.R.S.;
Glasg.P.S.i.; I.CE.; M.O.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.
- Smiths. Misc. Col.** Smithsonian Miscellaneous Collections. Washington.
1862— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.T.C.; Edinb.
R.S.; Edinb.U.; Geol.M.; Geol.S.i.; Glasg.P.S.; Glasg.U.;
I.CE.; Linn.S.; M.O.i.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.i.;
R.A.S.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- Smiths. Rp.** Annual Report of the Board of Regents of the Smithsonian Institution. Washington.
1846— B.M.i.; Camb.P.S.; Camb.U.; Dub.T.C.; Edinb.R.S.i.;
Geol.M.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.i.; Math.S.i.;
M.O.i.; N.H.M.i.; Oxon.B.; Oxon.R.i.; Pharm.S.i.; P.O.i.;
R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.i.; S.K.i.; U.C.L.i.
- Som. S. P.** Somersetshire Archaeological and Natural History Society's Proceedings. Taunton.
1849— B.M.; Camb.U.; Dub.R.I.A.; Geol.S.i.; Glasg.P.S.i.;
Linn.S.i.; N.H.M.; Oxon.B.i.; R.S.i.; S.K.i.; U.C.L.i.
- Sperim.** Lo Sperimentale. Giornale critico di Medicina e Chirurgia. Firenze.
1858—79.
Lo Sperimentale. Giornale Italiano di Scienze Mediche. Firenze,
Siena.
1879— Edinb.U.i.; R.C.Surg.; R.S.i.
- Spet. It. Mm.** Memorie della Società degli Spettroscopisti Italiani, raccolte e
pubblicate per cura del Prof. P. Tacchini. Palermo.
1872— B.M.i.; Camb.U.; Edinb.R.S.i.; P.O.; R.A.S.; R.S.
See **Palermo Mm. Spet. It.**
- Spongia Cm. Md.** Commentarii di Medicina; Spongia. Padova.
1836—37. Glasg.P.S.i.
- Steierm. Ggn. Mont.
Vr. B.** Bericht des Geognostisch-Montanistischen Vereines für Steiermark.
Graz.
1852—63. Geol.S.i.; Glasg.P.S.i.; N.H.M.; R.S.; S.K.
- Steierm. Mt.** Mittheilungen des Naturwissenschaftlichen Vereins für Steiermark.
Graz.
1863— B.M.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.;
Linn.S.i.; M.O.i.; N.H.M.; R.S.; U.C.L.i.
See **Graz Mt. NW. Vr. Steierm.**
- St. Ét. Bil. S. In. Mn.** ... Bulletin de la Société de l'Industrie minérale. St. Étienne.
St. Ét. S. In. Mn. Bil. { 1855— I.CE.; P.O.i.; S.K.i.
- Stett. E. Ztg.** Entomologische Zeitung; herausg. v. d. Entomologischen Vereine
zu Stettin. Stettin.
1840—B.M.; Camb.U.; Linn.S.; N.H.M.
- St. Gal. B.** Bericht über die Thätigkeit der St. Gallischen Naturwissenschaft-
lichen Gesellschaft. St. Gallen.
1860— N.H.M.; R.S.i.
- St. Louis Ac. T.** The Transactions of the Academy of Science of St. Louis. St. Louis.
St. Louis T. Ac. { 1856— B.M.; Dub.R.I.A.; Edinb.R.S.; Geol.S.i.; Glasg.P.S.;
Linn.S.i.; N.H.M.; Oxon.B.; P.O.i.; R.Geogr.S.; R.S.; S.K.
- Stockh. Ac. Hndl.** Kongliga Svenska Vetenskaps-Akademiens Handlingar. Stockholm.
Stockh. Ak. Hndl. { 1739— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
Edinb.R.S.i.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.i.;
N.H.M.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.
- Stockh. Ak. Hndl. Bh.** ... Bihang till Kongl. Svenska Vetenskaps-Akademiens Handlingar.
Stockholm.
Stockh. Bh. Ak. Hndl. { 1872— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.R.I.A.;
Edinb.R.S.; Geol.S.; Glasg.P.S.; Linn.S.; N.H.M.; R.A.S.;
R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Stockh. Gl. För. F.** Geologiska Föreningens i Stockholm Förhandlingar. Stockholm.
1872— B.M.; Geol.M.; Geol.S.; U.C.L.i.
- Stockh. Öfv.** Öfversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Stock-
holm.

List of Serial Publications

- 1844— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
Edinb.R.S.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; Linn.S.i.;
N.H.M.; Oxon.R.; R.A.S.; R.Geogr.S.; R.S.; U.C.L.i.
- Stockh. Vt. Ak. Lefn.** ... Lefnadsteckningar öfver Kongl. Svenska Vetenskaps Akademien...
ledamöter. Stockholm.
- 1869— Chem.S.i.; Dub.R.I.A.; Edinb.R.S.; Geol.S.; Glasg.P.S.;
Linn.S.i.; R.A.S.; R.Geogr.S.; R.S.
- St. Pét. Ac. Mm.** Mémoires de l'Académie Impériale des Sciences de St. Pétersbourg.
St. Pétersbourg.
- 1803— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.;
Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.M.i.;
Geol.S.i.; Glasg.U.i.; Linn.S.i.; M.O.i.; N.H.M.; Oxon.B.;
Oxon.R.; P.O.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.; S.K.i.;
U.C.L.i.
- See St. Pét. Ac. Sc. Mm. and St. Pét. Mm.*
- St. Pét. Ac. Sc. Bil.** Bulletin Scientifique publié par l'Académie Impériale des Sciences
de St. Pétersbourg. St. Pétersbourg.
- 1836—42.
Bulletin de la Classe Physico-mathématique de l'Académie Impériale
des Sciences de St. Pétersbourg. St. Pétersbourg, Leipzig.
- 1843—59.
Bulletin de l'Académie des Sciences de St. Pétersbourg. St. Péters-
bourg.
- 1860— B.M.i.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
Edinb.R.S.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.; Linn.S.i.; N.H.M.;
Oxon.B.; Oxon.R.i.; P.O.i.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.;
R.S.; S.K.
- See St. Pét. Bil. Ac. Sc.*
- St. Pét. Ac. Sc. Mm.** *See St. Pét. Ac. Mm. and St. Pét. Mm.*
- St. Pet. Ac. Sc. Mm. (Rs.)** Memoirs of the Imperial Academy of Science. [In Russian.]
St. Petersburg. [Not the same as **St. Pét. Ac. Mm.**]
- 1862—94. B.M.; Dub.R.I.A.
- St. Pet. Ac. Sc. N. Acta**... Nova Acta Academiae Scientiarum Imperialis Petropolitanae. Petropoli.
1783—1802. B.M.; Camb.U.; Edinb.R.S.; Linn.S.i.; N.H.M.;
Oxon.B.; Oxon.R.; P.O.; R.A.S.i.; R.C.Surg.; R.S.; U.C.L.
- St. Pét. Bil. Ac. Sc.** } *See St. Pét. Ac. Sc. Bil.*
- St. Pét. Bil. Sc.** }
- St. Pét. Com. Gl. Bil.** ... Bulletins du Comité Géologique. St. Pétersbourg.
- 1883— Dub.R.I.A.; Edinb.R.S.; Geol.M.; Geol.S.; Glasg.P.S.i.;
R.S.; S.K.i.; U.C.L.
- St. Pet. Md. Wschr.** St. Petersburg Medicinische Wochenschrift. St. Petersburg.
- 1876— B.M.; Camb.U.i.; Glasg.P.S.i.; R.C.Surg.
- St. Pét. Mm.** } *See St. Pét. Ac. Mm. and St. Pét. Ac. Sc. Mm.*
- St. Pét. Mm. Ac. Sc.** }
- St. Pét. Mm. Sav. Étr.** ... Mémoires présentés à l'Académie Impériale des Sciences de St. Péters-
bourg par divers Savans. St. Pétersbourg.
- 1831—59. B.M.; Camb.U.; Edinb.R.S.; Glasg.U.; Linn.S.;
N.H.M.; R.A.S.; R.C.Surg.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- St. Pet. Mn. Gs. Vh.** Verhandlungen der Russisch-Kaiserlichen Mineralogischen Gesell-
schaft zu St. Petersburg. St. Petersburg.
- 1842— B.M.; Camb.U.i.; Dub.T.C.; Edinb.R.S.i.; Geol.M.i.;
Geol.S.; N.H.M.; R.Geogr.S.i.; R.S.i.; U.C.L.i.
- St. Quent. A.** Annales Agricoles du département de l'Aisne, publiées par la Société
des Sciences, Arts, Belles-Lettres et Agriculture de St. Quentin.
- 1831—42.
Annales Scientifiques, Agricoles et Industrielles du département de
l'Aisne (Société Académique de Saint Quentin). St. Quentin.
- 1844—55? B.M.; Oxon.B.i.; R.S.i.
- St. Quent. Mm.** Mémoires de la Société des Sciences, Arts, Belles-Lettres et Agriculture
de la ville de St. Quentin. St. Quentin.
- 1831— B.M.; R.S.i.
- Strasb. J. S. Sc.** Journal de la Société des Sciences, Agriculture et Arts, du départe-
ment du Bas-Rhin. Strasbourg.
- 1824—28. [Continuation of: Mémoires, etc., 1811—23.] B.M.;
Camb.U.; N.H.M.; Oxon.B.; R.S.
- See Strasb. S. Sc. J.*

List of Serial Publications

- Strasb. Mm. S. H. Nt. ...** { Mémoires de la Société des Sciences Naturelles de Strasbourg.
Strasbourg.
- Strasb. Mm. S. Sc.** { 1830—70. B.M.; Camb.U.; Dub.R.I.A.i.; Dub.T.C.i.; Geol.S.i.;
N.H.M.; R.S.; S.K.i.
- Strasb. S. H. Nt. Mm. ...** { Bulletin de la Société des Sciences Naturelles de Strasbourg.
Strasbourg.
- Strasb. S. Sc. Bll.** { 1868—70. B.M.; Geol.S.; N.H.M.i.
- Strasb. S. Sc. J.** { See **Strasb. J. S. Sc.**
- Strasb. S. Sc. Mm.** { Mémoires de la Société des Sciences, Agriculture et Arts de
Strasbourg. Strasbourg.
- St. Sp. Ag. It.** { 1811—23. [Continued as: Journal, etc., 1824—28.] Camb.U.;
N.H.M.; Oxon.B.
- St. Thom. Hosp. Rp.** { Le Stazioni Sperimentali Agrarie Italiane. Torino, Roma, Firenze,
Asti, Modena.
- St. Thom. Hosp. Rp.** { 1872— B.M.i.; Chem.S.i.; R.S.i.
- St. Thom. Hosp. Rp.** { St. Thomas's Hospital Reports. London.
- Stud.** { 1836; 1870— Camb.U.; Edinb.U.i.; Glasg.P.S.i.; Glasg.U.i.;
Oxon.B.; Oxon.R.; R.C.Surg.; R.S.i.; U.C.L.i.
- Stud.** { The Student and Intellectual Observer of Science, Literature, and
Art. London.
- Sturgeon A. Electr.** { 1868—71. [Continuation of: The Intellectual Observer, 1862—68.]
B.M.; Camb.U.; Geol.S.; Glasg.P.S.i.; Linn.S.; N.H.M.; Oxon.R.;
Pharm.S.; P.O.; R.A.S.; S.K.
- Sturgeon A. Electr.** { Annals of Electricity, Magnetism, and Chemistry; and Guardian of
Experimental Science; Sturgeon. London.
- S. W. I. E. P.** { 1836—43. B.M.; Camb.U.; Chem.S.; Edinb.U.i.; Glasg.U.i.;
I.CE.i.; Oxon.B.i.; Oxon.R.; Pharm.S.; P.O.; R.S.; S.K.
- S. W. I. E. P.** { Proceedings and Transactions of the South Wales Institute of
Engineers. Merthyr Tydfil, Swansea, Cardiff.
- S. W. R. I. Rp.** { 1857— B.M.i.; Camb.U.i.; Geol.S.; Glasg.U.i.; I.CE.; P.O.;
S.K.; U.C.L.i.
- S. W. R. I. Rp.** { The Annual Report of the Council of the Royal Institution of South
Wales, with Appendix of Original Papers on Scientific Subjects.
Swansea.
- Sym. Met. Mg.** { 1839— B.M.i.; Dub.R.D.S.; R.S.i.
- Sym. Met. Mg.** { Symons's Monthly Meteorological Magazine. London.
- Sym. Met. Mg.** { 1866— Camb.U.; I.CE.; M.O.; P.O.; R.Geogr.S.i.; R.S.
- Tasm. R. S. M. Not.** { Monthly Notices of Papers and Proceedings of the Royal Society
of Tasmania. Hobart.
- Tasm. R. S. P.** { 1863— B.M.i.; Camb.P.S.i.; Dub.R.D.S.; Edinb.R.S.i.; Geol.S.;
Linn.S.i.; M.O.i.; N.H.M.; R.A.S.; R.C.Surg.i.; R.Geogr.S.i.;
R.S.; S.K.i.
- Taylor Sc. Mm.** { Scientific Memoirs, selected from the Transactions of Foreign
Academies and Learned Societies and from Foreign Journals;
Taylor. London.
- Taylor Sc. Mm.** { 1837—52. B.M.; Camb.U.; Chem.S.i.; Edinb.R.S.; Geol.S.;
Glasg.U.; I.CE.; Linn.S.i.; M.O.; N.H.M.; Oxon.B.(R.);
P.O.; R.A.S.i.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Tel. E. J.** { Journal of the Society of Telegraph Engineers. London.
- Tel. E. J.** { 1872—89. [Continued as: Journal of the Institution of Electrical
Engineers, 1890—] B.M.; Camb.P.S.; Camb.U.i.; Dub.T.C.i.;
I.CE.; Oxon.B.; Oxon.R.; P.O.; R.S.; S.K.; U.C.L.
- Tel. J.** { The Telegraphic Journal and Electrical Review. London.
- Tel. J.** { 1872—91. [Continued as: The Electrical Review, 1892—] B.M.;
Edinb.U.i.; Glasg.P.S.; I.CE.; Oxon.B.; P.O.; R.A.S.i.; R.S.;
S.K.
- Tel. Vr. Z.** { Zeitschrift des Deutsch-Oesterreichischen Telegraphen-Vereins.
Herausg. in dessen Auftrage von der K. Preuss. Telegraphen-
Direction. Berlin.
- Tel. Vr. Z.** { 1854—69. I.CE.; P.O.
- Tel. Vr. Z.** { See **Berl. Tel. Vr. Z.** and **Berl. Z. Tel.**
- Termt. Közl.** { Természettudományi Közlöny. Havi folyóirat közérdekű ismeretek
terjesztésére. Kiadja a K. M. Természettudományi Társulat.
Budapest.
- Termt. Közl.** { 1869— B.M.; Camb.P.S.i.; N.H.M.

List of Serial Publications

- Terr. Mag.** Terrestrial Magnetism [and Atmospheric Electricity]. An International Quarterly Journal. Chicago, Cincinnati, Baltimore. 1896— Camb.U.i.; R.Geogr.S.; R.S.; S.K.
- Texas Ac. Sc. T.** Transactions of the Texas Academy of Science. Austin. 1892— Camb.P.S.; Edinb.R.S.; Glasg.P.S.; Math.S.i.; N.H.M.; R.Geogr.S.; R.S.
- Thomson A. Ph.** Annals of Philosophy; or, Magazine of Chemistry, Mineralogy, Mechanics, Natural History, Agriculture, and the Arts; Thomson. London. 1813—26. [*Continued in:* The Philosophical Magazine, 1827—] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Edinb.R.S.i.; Geol.S.; Glasg.U.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.; P.O.; R.A.S.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
- Thomson Re.** Records of General Science; R. D. and Thos. Thomson. London. 1835—36. B.M.; Camb.U.; Glasg.P.S.i.; Glasg.U.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; U.C.L.i.
- Tilloch Ph. Mg.** The Philosophical Magazine, comprehending the various branches of Science, the Liberal and Fine Arts, Geology, Agriculture, Manufactures, and Commerce. London. 1798—1826. [*Continued as:* The Philosophical Magazine, or Annals of Chemistry, etc., 1827—] B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Edinb.R.S.i.; Edinb.U.; Geol.S.; Glasg.P.S.; Glasg.U.i.; I.CE.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.; R.A.S.; R.C.Surg.; R.S.; S.K.; U.C.L.
- Tim.** Timehri: the Journal of the Royal Agricultural and Commercial Society of British Guiana. Demerara. 1882— B.M.; Camb.U.i.; Geol.S.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.i.; Pharm.S.i.; R.Geogr.S.; R.S.i.
- Tindal Vh. Zeewezen** ... Verhandeligen en Berigten betrekkelijk het Zeewezen en de Zeewartkunde; Tindal en Swart. Amsterdam. 1852—70. B.M.; P.O.; R.Geogr.S.i.; R.S.i.
- Tōk. Coll. Sc. J.** The Journal of the College of Science, Imperial University, Japan. Tōkio, Japan. 1887— [*Continuation of:* Memoirs of the Science Department, University of Tokio, Japan, 1879—85.] B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.T.C.; Edinb.R.S.; Edinb.U.i.; Geol.M.i.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; Math.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.Geogr.S.; R.S.; S.K.; U.C.L.
- Tok. Gl. S. Gl. Mg.** The Geological Magazine. Geological Society of Tōkyō. Tōkyō. 1894—98. [*Continued as:* The Journal of the Geological Society of Tōkyō, 1898—] Geol.M.i.; N.H.M.
- Tōk. Gl. S. J.** The Journal of the Geological Society of Tōkyō. Tōkyō. 1898— [*Continuation of:* The Geological Magazine, 1894—98.] Glasg.P.S.i.; N.H.M.
- Tok. Un. Mm.** Memoirs of the Science Department, University of Tokio, Japan. 1877—85. [*Continued as:* The Journal of the College of Science, Imperial University, Japan, 1887—] Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.i.; Geol.S.; Glasg.P.S.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- Tor. Ac. Mm.** Memorie della R. Accademia delle Scienze di Torino. Torino. 1818— [*Continuation of:* Mémoires de l'Académie Royale des Sciences de Turin, 1784—1816.] B.M.i.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Geol.S.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.i.
- Tor. Ac. Sc. At.** See **Tor. Ac. Sc. Mm.** and **Tor. Mm. Ac.**
Atti della R. Accademia delle Scienze di Torino. Torino. 1865— B.M.; Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.; Edinb.R.S.; Geol.S.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.; P.O.i.; R.A.S.; R.S.; S.K.; U.C.L.i.

See **Tor. At. Ac. Sc.**

[In the references to this serial two sets of paging are sometimes given; the first refers to the volumes containing the Classe di Scienze Fisiche, Matematiche e Naturali only, the second to the

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volumes containing all the sections. When only one paging is given, it refers to the fuller series.]

- Tor. Ac. Sc. Mm.** See **Tor. Ac. Mm. and Tor. Mm. Ac.**
Tor. At. Ac. Sc. See **Tor. Ac. Sc. At.**
Tor. Lav. Sc. Fis. Mt. ... Notizia storica dei lavori fatti dalla Classe di Scienze Fisiche e Matematiche della R. Accademia delle Scienze. Torino. 1864—65. [*Continued as:* Atti della R. Accademia, etc., 1865—] Geol.S.; Linn.S.; R.A.S.; R.S.
Tor. Mm. Ac. See **Tor. Ac. Mm. and Tor. Ac. Sc. Mm.**
Tortolini A. Annali di Scienze Matematiche e Fisiche; Tortolini. Roma. 1850—57. Annali di Matematica pura ed applicata...; Tortolini. Roma, Milano. 1858— B.M.; Camb.U.i.; Dub.R.D.S.; Dub.T.C.; Edinb.U.; Glasg.U.i.; Oxon.B.(R.); R.S.; U.C.L.
Toul. Ac. Sc. Bll. See **A. Mt.**
 Bulletin de l'Académie des Sciences, Inscriptions et Belles-Lettres de Toulouse. Toulouse. 1898—99. Dub.R.I.A.; Edinb.R.S.; N.H.M.; R.S.
Toul. Ac. Sc. Mm. Mémoires de l'Académie des Sciences, Inscriptions et Belles-Lettres de Toulouse. Toulouse. 1782— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.i.; N.H.M.; Oxon.B.i.; R.A.S.i.; R.C.Surg.i.; R.S.; S.K.i.
Toul. Fac. Sc. A. See **Toul. Mm. Ac.**
 Annales de la Faculté des Sciences de Toulouse pour les Sciences Mathématiques et les Sciences Physiques. Paris. 1887— Camb.P.S.; Camb.U.; Edinb.R.S.; Math.S.; Oxon.R.; R.S.
Toul. Mm. Ac. } See **Toul. Ac. Sc. Mm.**
Toul. Mm. Ac. Sc. }
Toul. S. H. Nt. Bll. Bulletin de la Société d'Histoire Naturelle de Toulouse. Toulouse. 1867— Geol.S.i.; N.H.M.
Toul. S. Sc. Bll. Bulletin de la Société des Sciences Physiques et Naturelles de Toulouse. Toulouse. 1872— B.M.; Glasg.P.S.i.; N.H.M.
Trieste Bll. Bollettino della Società Adriatica di Scienze Naturali in Trieste. Trieste. 1875— N.H.M.; R.S.
Trommsdorff J. Phm. ... Journal der Pharmacie für Aerzte und Apotheker. Leipzig. 1794—1816. [*Continued as:* Neues Journal, etc., 1817—33.] B.M.; Dub.T.C.i.; R.C.Surg.; R.S.
Trommsdorff N. J. Phm. ... Neues Journal der Pharmacie für Aerzte, Apotheker, und Chemisten; Trommsdorff. Leipzig. 1817—33. [*Continuation of:* Journal, etc., 1794—1816.] R.C.Surg.; R.S.
Ts. Mt. Fys. Tidsskrift för Matematik och Fysik, tillegnad den Svenska Elementar-Undervisningen. Upsala. 1868—74. B.M.; R.S.i.
Ts. Mth. Tidsskrift for Mathematik. Kjøbenhavn. 1865—89. [*Continuation of:* Mathematisk Tidsskrift, 1859—64.] [*Continued as:* Nyt Tidsskrift for Mathematik, 1890—] B.M.; Camb.U.; Math.S.i.; Oxon.B.; S.K.i.
Ts. Ps. C. Tidsskrift for Fysik og Chemi samt disse Videnskabers Avendelse. Kjøbenhavn. 1862—94. [*Continued as:* Nyt Tidsskrift for Fysik og Kemi, 1896—98.] B.M.; N.H.M.
Tübinger Bl. Tübinger Blätter für Naturwissenschaften und Arzneikunde. Tübingen. 1815—17. B.M.; Glasg.P.S.i.; R.C.Surg.; R.S.; U.C.L.i.
Turin Ac. Mm. } Mémoires de l'Académie Royale des Sciences de Turin. Turin.
Turin Mm. Ac. } 1784—1816. [*Continued as:* Memorie della R. Accademia delle Scienze di Torino, 1818—] B.M.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.U.i.; Linn.S.; Oxon.B.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.
Ung. NW. Vr. Jb. Abhandlungen aus dem dritten Bande der Jahrbücher des Ungarischen Naturwissenschaftlichen Vereins zu Pest, in Deutscher Uebersetzung red. von J. Szabó. Pest. 1858. B.M.; Glasg.P.S.i.

List of Serial Publications

- Un. Serv. I. J.** { Journal of the Royal United Service Institution. London.
1858— B.M.; Camb.U.; Dub.N.L.I.; Edinb.U.; I.CE.;
Un. Serv. J. { Oxon.B.i.; P.O.; R.Geogr.S.; R.S.; S.K.i.; U.C.L.i.
- Ups. Årsk.** Upsala Universitetets Årsskrift. Upsala.
1861— B.M.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.;
Linn.S.i.; Math.S.i.; N.H.M.; Oxon.B.; R.A.S.i.; R.S.
- Ups. Läk. F.** Upsala Läkareförenings Förhandlingar. Upsala.
1865— B.M.i.; Pharm.S.i.; R.C.Surg.i.
- Ups. N. Acta S. Sc.** Nova Acta Regiæ Societatis Scientiarum Upsaliensis. Upsaliæ.
Ups. S. Sc. N. Acta { 1773— B.M.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.i.; Glasg.U.i.;
Linn.S.; Math.S.i.; N.H.M.; Oxon.B.i.; Oxon.R.; R.A.S.i.;
R.C.Surg.; R.S.i.; S.K.; U.C.L.i.
- [U.S.] Chief Sig. Off. A.** Annual Report of the Chief Signal Officer [of the Army] to the
Rp. Secretary of War. Washington.
1871—90. [*Continued as:* U.S. Department of Agriculture.
Weather Bureau. Report of the Chief of the Weather Bureau,
1891—] Camb.U.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Edinb.U.i.;
Glasg.U.i.; I.CE.i.; M.O.; Oxon.R.i.; P.O.i.; R.Geogr.S.; R.S.i.;
S.K.i.
- U. S. Coast Geod. Sv. Bll.** United States Coast and Geodetic Survey. Bulletin. Washington.
1888— B.M.i.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.i.;
I.CE.i.; Oxon.R.i.; R.A.S.; R.Geogr.S.i.; R.S.
- U. S. Coast Sv. Rp.** Reports of the Superintendent of the Coast Survey, showing the
Progress of the Survey from year to year. Washington.
1851— Camb.U.; Dub.R.I.A.i.; Edinb.R.S.; Glasg.U.i.; I.CE.;
M.O.i.; N.H.M.; R.A.S.; R.Geogr.S.i.; R.S.; S.K.i.; U.C.L.i.
- U.S. Dpt. Ag. Yearb.** ... Yearbook of the United States Department of Agriculture.
Washington.
1894— [*Continuation of:* Report of the Commissioner [Secretary]
of Agriculture, 1862—93.] B.M.; Camb.P.S.i.; Camb.U.i.;
Chem.S.i.; Edinb.R.S.i.; Edinb.U.i.; Glasg.U.; M.O.i.; Oxon.
B.i.; Oxon.R.; P.O.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
- U. S. Fish Com. Rp.** United States Commission of Fish and Fisheries. Report of the
Commissioner. Washington.
1873— B.M.i.; Camb.P.S.i.; Edinb.R.S.; Edinb.U.i.; Glasg.P.S.i.;
Glasg.U.i.; I.CE.i.; Linn.S.i.; N.H.M.; Oxon.B.; Oxon.R.;
P.O.i.; R.S.; S.K.
- U. S. Gl. Sv. Bll.** Bulletin of the United States Geological Survey. Washington.
1883— Camb.P.S.; Chem.S.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.;
Edinb.U.i.; Geol.M.; Geol.S.; Glasg.U.i.; I.CE.i.; N.H.M.;
Oxon.B.; Oxon.R.i.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.
- U. S. Gl. Sv. Rp.** Annual Report of the United States Geological Survey to the
Secretary of the Interior. Washington.
1880— Camb.P.S.; Camb.U.; Chem.S.i.; Edinb.R.S.; Edinb.U.;
Geol.M.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.i.; Linn.S.i.;
N.H.M.; Oxon.B.; Oxon.R.; P.O.i.; R.Geogr.S.; R.S.; S.K.;
U.C.L.
- U. S. Mly. Weath. Rv.** ... United States of America: Department of Agriculture. Monthly
Weather Review and Annual Summary. Washington, D.C.
1873— B.M.i.; Edinb.R.S.i.; I.CE.i.; M.O.; Oxon.B.; Oxon.R.i.;
R.Geogr.S.i.; R.S.i.; S.K.i.
- U. S. Ms. P.** Department of the Interior...Proceedings of the United States
National Museum. Washington.
1879— Camb.P.S.; Camb.U.; Edinb.R.S.; Edinb.U.i.; Geol.S.;
Glasg.P.S.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.;
R.Geogr.S.; R.S.i.; S.K.i.; U.C.L.i.
- U.S. Sec. Ag. Rp.** Report of the Secretary of Agriculture. Washington.
1889—93. [*Continuation of:* Report of the Commissioner of Agri-
culture, 1862—88.] [*Continued as:* Yearbook of the United
States Department of Agriculture, 1894—] B.M.; Camb.P.S.i.;
Camb.U.i.; Dub.N.L.I.; Dub.R.I.A.; Glasg.P.S.i.; Glasg.U.i.;
I.CE.i.; M.O.i.; N.H.M.; P.O.; R.Geogr.S.i.; R.S.i.; S.K.i.;
U.C.L.i.
- U. S. Sig. Serv. Pp.** United States of America: War Department. Professional Papers of
the Signal Service. Washington.
1881— B.M.i.; Dub.R.I.A.; Edinb.R.S.; Glasg.P.S.i.; M.O.;
R.A.S.i.; R.S.

List of Serial Publications

- U.S. Weath. Bur. Bl.** ... U.S. Department of Agriculture. Weather Bureau. Bulletin. Washington.
1892— Dub.R.I.A.; Edinb.R.S.i.; I.CE.i.; M.O.; Oxon.R.i.; P.O.i.; R.Geogr.S.i.; R.S.i.
- U.S. Weath. Bur. Rp.** ... U.S. Department of Agriculture. Weather Bureau. Report of the Chief of the Weather Bureau. Washington.
1891— [*Continuation of*: Annual Report of the Chief Signal Officer, 1871—90.] Dub.R.I.A.; Edinb.R.S.; Glasg.U.i.; I.CE.; M.O.; Oxon.R.i.; R.Geogr.S.; R.S.
- Utr. A. Ac.** *Annales Academiæ Rheno-Trajectinæ. Trajecti ad Rhenum* (Utrecht).
1815—37. B.M.; Camb.U.i.; Glasg.U.i.; N.H.M.; Oxon.B.; Oxon.R.i.; R.C.Surg.; R.S.i.; S.K.i.
- Utr. Aant. Prv. Gn.** Aanteekeningen van het Verhandelde in de Sectie-Vergaderingen van het Provinciaal Utrechtsch Genootschap van Kunsten en Wetenschappen. Utrecht.
1846— Dub.R.D.S.; Edinb.R.S.; R.S.
See Utr. Prv. Gn. Aant.
- Utr. Oz.** [Scheikundige] Onderzoekingen, gedaan in het [Physiologisch] Laboratorium der Utrechtsche Hoogeschool. Rotterdam, Utrecht.
Utr. Scheik. Oz. { 1842—56; 1867— Glasg.P.S.i.; R.S.i.
- Utr. Prv. Gn. Aant.** *See Utr. Aant. Prv. Gn.*
- Valenciennes Mm.** { *Mémoires de la Société d'Agriculture, des Sciences et des Arts de l'arrondissement de Valenciennes. Valenciennes.*
Valenciennes Mm. S. Ag. { 1833—53. B.M.; Oxon.B.i.; R.S.i.
- Vars. S. Nt. Tr. (C. R., Bl.)** *Travaux de la Société des Naturalistes de Varsovie. Comptes Rendus de la Section biologique.* [In Russian.] Varsovie.
1889— Glasg.P.S.i.; N.H.M.
- Vars. S. Nt. Tr. (C. R., Ps. C.)** *Travaux de la Société des Naturalistes de Varsovie. Comptes Rendus de la Section de physique et de chimie. Varsovie.* [In Russian.]
1889— Math.S.; N.H.M.
- Vars. S. Nt. Tr. (Mm.)** *Travaux de la Société des Naturalistes de Varsovie. Mémoires.* [In Russian.] Varsovie.
1891—96. Math.S.; N.H.M.
- Vauc. Ac. Mm.** *Mémoires de l'Académie de Vaucluse. Avignon.*
1882— N.H.M.
- V. Diem. R. S. Pp.** *Papers and Proceedings of the Royal Society of Van Diemen's Land. Hobart Town.*
1851—59. B.M.i.; Camb.P.S.i.; Dub.R.D.S.; Edinb.R.S.i.; Geol.S.; I.CE.i.; N.H.M.i.; R.A.S.i.; R.Geogr.S.i.; R.S.; S.K.
- Ven. At.** *Atti delle Adunanze dell' I. R. Istituto Veneto di Scienze, Lettere ed Arti. Venezia.*
1841— B.M.; Dub.R.D.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; I.CE.i.; Linn.S.i.; Math.S.i.; N.H.M.; R.S.i.
See Ven. I. At.
- Ven. At. Aten.** *Atti dell' Ateneo Veneto. Venezia.*
1864—77. [*Continuation of*: *Esercitazioni Scientifiche e Letterarie dell' Ateneo di Venezia, 1837—60.*] [*Continued as*: *L' Ateneo Veneto, 1878—*] Dub.R.D.S.; R.S.
- Ven. Aten.** *L' Ateneo Veneto: Rivista mensile di Scienze, Lettere ed Arti. Venezia.*
1878— [*Continuation of*: *Atti dell' Ateneo Veneto, 1864—77.*] Dub.R.D.S.i.; R.S.i.
- Ven. Aten. Esercit.** *Esercitazioni Scientifiche e Letterarie dell' Ateneo di Venezia. Venezia.*
Ven. Esercit. Aten. { 1837—60. [*Continued as*: *Atti dell' Ateneo Veneto, 1864—77.*] B.M.i.; Dub.T.C.i.; Oxon.B.i.; R.S.i.
See Ven. At.
- Ven. I. At.** *Memorie del Reale Istituto Veneto di Scienze, Lettere ed Arti. Venezia.*
Ven. I. Mm. { 1843— B.M.; Camb.U.; Dub.R.I.A.i.; Linn.S.i.; N.H.M.; Oxon.B.i.; R.C.Surg.i.; R.S.; S.K.
- Ven. Mm. I.** { 1807— B.M.i.; Glasg.P.S.i.; Oxon.B.i.
- Verona Mm. Ac. Ag.** ... *Memorie dell' Accademia d'Agricoltura, etc., di Verona. Verona.*
1807— B.M.i.; Glasg.P.S.i.; Oxon.B.i.

List of Serial Publications

- Verona Mm. S. It.** { *Memorie di Matematica e di Fisica della Società Italiana delle Scienze.* Modena, Verona.
1782— B.M.i.; Camb.P.S.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.i.; Glasg.U.i.; Linn.S.i.; Oxon.B.i.; R.A.S.i.; R.C.Surg.i.; R.S.; S.K.i.; U.C.L.i.
- Verona S. It. Mm.** { *See Mod. Mm. S., Mod. S. It. Mm. and Rm. S. It. Mm.*
- Vict. I. J.** *Journal of the Transactions of the Victoria Institute, or Philosophical Society of Great Britain.* London.
1867— B.M.; Camb.U.; Dub.R.D.S.; Dub.T.C.; Geol.M.i.; Geol.S.; N.H.M.; Oxon.B.; P.O.; R.Geogr.S.i.; R.S.i.; S.K.
- Vict. R. S. P.** *Proceedings of the Royal Society of Victoria.* Melbourne.
1889— [*Continuation of:* Transactions and Proceedings, etc., 1861—88.] B.M.; Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.; Glasg.U.; I.CE.i.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.; U.C.L.i.
- Vict. R. S. T.** *Transactions and Proceedings of the Royal Society of Victoria.* Melbourne.
1861—88. [*Divided into:* Transactions, 1888—, and Proceedings, 1889—] B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.S.; Glasg.P.S.i.; Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.i.; P.O.; R.A.S.; R.C.Surg.i.; R.Geogr.S.; R.S.; S.K.
- Vict. T. Ph. S.** *See Vict. T. R. S.*
Transactions of the Philosophical Society of Victoria. Melbourne.
1855. [*Continued as:* Transactions of the Philosophical Institute, etc., 1855—60.] B.M.; Edinb.R.S.; Geol.S.; Linn.S.; N.H.M.; R.A.S.; R.Geogr.S.; R.S.; S.K.
- Vict. T. R. S.** *See Vict. R. S. T.*
- Virch. Arch.** *Archiv für Pathologische Anatomie und Physiologie und für Klinische Medicin; Virchow und Reinhardt.* Berlin.
1847— B.M.; Camb.U.; Chem.S.i.; Edinb.U.; Glasg.P.S.i.; Glasg.U.i.; Oxon.R.; R.C.Surg.; R.S.; U.C.L.
- V. Mons J. C.** *Journal de Chimie, pour servir de complément aux Annales de Chimie et autres ouvrages périodiques français de cette science; Van Mons.* Bruxelles.
1792—1804. Glasg.P.S.i.; R.S.i.
- V. Nost. Eng. Mg.** *Van Nostrand's Engineering Magazine.* New York.
1869—85. [*Continued as:* The Railroad and Engineering Journal, 1887—92.] B.M.; I.CE.i.; P.O.; R.S.i.
- Voigt Mg.** *Magazin für den neuesten Zustand der Naturkunden, mit Rücksicht auf die dazu gehörigen Hilfswissenschaften; Voigt.* Jena, Weimar.
1797—1806. B.M.; Camb.U.; N.H.M.; R.S.
- Walker Electr. Mg.** *The Electrical Magazine; Walker.* London, Paris.
1845—46. B.M.; Camb.U.; Glasg.P.S.i.; I.CE.; Oxon.B.; P.O.; R.S.
- Wash. As. Pp. for Ephem. & Naut. Alm.** *Astronomical Papers prepared for the use of the American Ephemeris and Nautical Almanac.* Washington.
1882— B.M.; Dub.R.I.A.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.i.; Oxon.R.; R.A.S.; R.S.
- Washburn Obs. Pb.** *Publications of the Washburn Observatory of the University of Wisconsin.* Madison.
1889— Camb.P.S.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.; Glasg.U.i.; R.A.S.; R.S.
- Wash. Mm. Nat. Ac.** *Memoirs of the National Academy of Sciences.* Washington.
1866— B.M.i.; Camb.P.S.; Camb.U.i.; Dub.R.I.A.; Edinb.R.S.; Glasg.U.i.; Math.S.i.; N.H.M.; Oxon.B.i.; Oxon.R.; P.O.; R.S.; S.K.; U.C.L.i.
- Wash. Nat. Ac. Mm.** {
- Wash. Ph. S. Bil.** *Bulletin of the Philosophical Society of Washington.* Washington.
1874— B.M.; Camb.P.S.; Edinb.R.S.; Geol.S.; Glasg.U.i.; Linn.S.; N.H.M.; Oxon.B.; P.O.; R.A.S.; R.S.; S.K.i.
- Weale Q. Pp.** *Quarterly Papers on Engineering; Weale.* London.
1843—49. B.M.; I.CE.; Oxon.B.; P.O.
- W. Eng. J.** *The West of England Journal of Science and Literature.* Bristol.

List of Serial Publications

- 1835—36. B.M.; Camb.U.; Edinb.R.S.; I.CE.; N.H.M.; Oxon.B.; P.O.; S.K.
- Westf. Vr. Jbr.** Jahres-Bericht des Westfälischen Provinzialvereins für Wissenschaft und Kunst. Münster.
- 1873— N.H.M.
- Wet. Gs. A.** Annalen der Wetterauischen Gesellschaft für die gesammte Naturkunde. Hanau, Frankfurt-am-Main.
- 1809—12. [*Continued as:* Neue Annalen, etc., 1819.] B.M.; Camb.U.; Glasg.P.S.i.; N.H.M.; R.C.Surg.; R.S.
- Wet. Gs. Jbr.** Bericht der Wetterauischen Gesellschaft für die gesammte Naturkunde zu Hanau. Hanau.
- 1843— Dub.R.I.A.i.; Geol.S.i.; R.S.i.
- See* **Wet. Gs. Nt. B.**
- Wet. Gs. N. A.** Neue Annalen der Wetterauischen Gesellschaft für die gesammte Naturkunde. Hanau, Frankfurt-am-Main.
1819. [*Continuation of:* Annalen, etc., 1809—12.] B.M.; Camb.U.; Glasg.P.S.i.; N.H.M.; R.C.Surg.; R.S.
- Wet. Gs. Nt. B.** *See* **Wet. Gs. Jbr.**
- Wetter** Das Wetter. Meteorologische Monatsschrift für Gebildete aller Stände. Magdeburg, Braunschweig, Berlin.
- 1885— B.M.; M.O.
- Wiad. Mt.** Wiadomości Matematyczne. Warsaw.
- 1897— Camb.P.S.; Math.S.
- Wien Ak. D.** Denkschriften der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. Wien.
- 1850— B.M.; Camb.P.S.i.; Camb.U.; Chem.S.i.; Dub.R.I.A.; Edinb.R.S.; Edinb.U.; Geol.M.i.; Geol.S.; Glasg.U.i.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.(R); P.O.i.; R.A.S.; R.C.Surg.i.; R.S.; S.K.; U.C.L.i.
- See* **Wien D.**
- Wien Ak. Sb.** Sitzungsberichte der Mathematisch-Naturwissenschaftlichen Classe der Kaiserlichen Akademie der Wissenschaften. Wien.
- 1848— B.M.; Camb.P.S.i.; Camb.U.; Chem.S.i.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.i.; Geol.S.; Glasg.U.; I.CE.i.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; Pharm.S.i.; P.O.i.; R.A.S.i.; R.C.Surg.i.; R.Geogr.S.i.; R.S.; S.K.; U.C.L.i.
- See* **Wien SB.**
- Wien Alm.** Almanach der Kaiserlichen Akademie der Wissenschaften. Wien.
- 1851— B.M.; Camb.P.S.i.; Camb.U.; Dub.R.I.A.i.; Edinb.R.S.i.; Glasg.U.i.; Oxon.B.; P.O.i.; R.A.S.i.; R.S.i.; S.K.i.; U.C.L.i.
- Wien Az.** Anzeiger der Kaiserlichen Akademie der Wissenschaften: Math.-Naturwiss. Classe. Wien.
- 1864— Camb.U.; Geol.S.i.; Linn.S.; N.H.M.; Oxon.B.; Pharm.S.i.; R.S.i.
- Wien Berg-Hm. Jb.** Berg- und Hüttenmännisches Jahrbuch der k. k. Schemnitzer Bergakademie und der k. k. Montan-Lehranstalten zu Leoben und Příbram. Wien.
- 1851— B.M.i.; Geol.S.i.; I.CE.i.; P.O.i.; S.K.
- See* **Berg-Hm. Jb., Jb Berg-Hm., and Leoben Berg-Hm. Jb.**
- Wien D.** *See* **Wien Ak. D.**
- Wien Gg. Gs. Mt.** Mittheilungen der k. k. Geographischen Gesellschaft. Wien.
- 1857— B.M.; Dub.R.I.A.i.; Dub.T.C.i.; M.O.i.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.; S.K.i.
- See* **Wien Mt. Gg. Gs.**
- Wien Gl. Jb.** Jahrbuch der k.k. Geologischen Reichsanstalt. Wien.
- Wien Jb. Gl.** 1850— Camb.P.S.; Camb.U.; Dub.R.I.A.; Dub.T.C.; Edinb.R.S.; Geol.M.; Geol.S.; Linn.S.; N.H.M.; Oxon.B.; Oxon.R.; P.O.; R.Geogr.S.i.; R.S.; U.C.L.i.
- Wien Jb. Pol. I.** Jahrbuch des k. k. Polytechnischen Instituts in Wien; Prechtl. Wien.
- 1819—39. B.M.; Camb.U.; Oxon.B.; P.O.
- Wien Jbr. Ober-Realsh. Inn. Stadt.** Jahresbericht der öffentlichen Ober-Realsschule in der innere Stadt. Wien.
- 1859—63.
- Wien Md. Wachr.** Wiener Medizinische Wochenschrift. Wien.
- 1851— B.M.; Camb.U.i.; R.C.Surg.i.
- Wien Met. Z.** Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie. Wien.

List of Serial Publications

- 1866—85. [*Continued in: Meteorologische Zeitschrift, 1886—*]
Camb.U.; Dub.R.D.S.; Edinb.R.S.; M.O.; P.O.; R.Geogr.S.; R.S.
See **Wien Z. Met.**
- Wien Mt. Gg. Gs.** *See* **Wien Gg. Gs. Mt.**
- Wien Pht. Cor.** Photographische Correspondenz. Organ der Photograph. Gesellsch.
in Wien. Wien.
1865— P.O.
- Wien Sb.** } *See* **Wien Ak. Sb.**
- Wien Sb.** }
- Wien Schr. Vr.Nw.Kennt.** { Schriften des Vereins zur Verbreitung Naturwissenschaftlicher
Kenntnisse in Wien. Wien.
- Wien Vr.Nw.Kennt.Schr.** { 1860— B.M.i.; Camb.U.i.; N.H.M.i.; P.O.; R.S.i.
Zeitschrift der K. K. Gesellschaft der Aerzte zu Wien. Wien.
- Wien Z. Gs. Aerzte** { 1844—60. [*Continued as: Medizinische Jahrbücher, 1861—*]
Glasg.P.S.i.; R.C.Surg.
- Wien Z. Met.** *See* **Wien Met Z.**
- Wild Rpm. Met.** Repertorium für Meteorologie, herausg. von der kaiserlichen Akad.
der Wissenschaften; Wild. St. Petersburg.
- Wisc. Ac. T.** 1870—94. B.M.; Camb.P.S.; Edinb.R.S.; Glasg.P.S.i.; Glasg.U.i.;
I.C.E.i.; M.O.; R.S.
Transactions of the Wisconsin Academy of Sciences, Arts and
Letters. Madison.
- Wisc. Un. Bll. (Sc.)** 1872— B.M.; Camb.P.S.; Dub.R.I.A.; Edinb.R.S.; Geol.S.i.;
N.H.M.; Oxon.R.i.; P.O.i.; R.S.; S.K.i.; U.C.L.i.
Bulletin of the University of Wisconsin. Science Series. Madison.
- Woolh. FC. T.** 1894— B.M.; Camb.U.; Dub.R.I.A.; Edinb.R.S.; Glasg.P.S.i.;
P.O.
Transactions of the Woolhope Naturalists' Field Club. Hereford.
- Woolw. P.** 1866— B.M.; Camb.U.i.; Dub.T.C.i.; Geol.M.i.; Geol.S.i.; Linn.
S.i.; N.H.M.i.; Oxon.B.; U.C.L.i.
Minutes of Proceedings of the Royal Artillery Institution. Woolwich.
- Würtb. Jh.** 1858— B.M.; Camb.U.i.; I.C.E.; P.O.; R.Geogr.S.i.
Jahreshefte des Vereins für vaterländische Naturkunde in Württem-
berg. Stuttgart.
- Würzb. Bt. I. Arb.** 1845— B.M.; Camb.U.; Dub.R.D.S.i.; Dub.T.C.i.; Geol.S.;
Linn.S.; N.H.M.; R.S.; S.K.
Arbeiten des Botanischen Instituts in Würzburg. Leipzig.
- Würzb. Jb. Ph. Md. Gs.** 1871—88. B.M.; Camb.U.; Glasg.P.S.i.; Linn.S.; N.H.M.;
Oxon.R.; R.C.Surg.; R.S.
Jahrbücher der Philosophisch-Medicinischen Gesellschaft zu Würz-
burg. Würzburg.
- Würzb. Nw. Z.** 1828. Dub.R.I.A.; R.S.; U.C.L.
Würzburger Naturwissenschaftliche Zeitschrift; herausgegeben von
der Physikalisch-Medicinischen Gesellschaft. Würzburg.
- Würzb. Ps. Md. Sb.** 1860—67. [*Continuation of: Verhandlungen der Physikalisch-
Medicinischen Gesellschaft, 1850—60.*] Camb.U.; Geol.S.i.;
Linn.S.; N.H.M.; Oxon.R.; S.K.
Sitzungsberichte der Physikalisch-Medicinischen Gesellschaft zu
Würzburg. Würzburg.
- Würzb. Ps. Md. Vh.** 1859—62; 1881— Camb.P.S.; Camb.U.; Chem.S.i.; Dub.R.I.A.;
Linn.S.i.; Oxon.R.i.; R.C.Surg.i.; R.S.
Verhandlungen der Physikalisch-Medicinischen Gesellschaft. Würz-
burg.
- Würzb. Vh.** { 1850—60. 1868— [*Continued as: Würzburger Medicinische Zeit-
schrift, and Würzburger Naturwissenschaftliche Zeitschrift,*
1860—67.] B.M.i.; Camb.P.S.i.; Camb.U.i.; Chem.S.i.; Dub.
R.I.A.; Linn.S.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.; S.K.i.;
U.C.L.i.
- W. Yorks. Gl. S. P.** { Proceedings of the Geological and Polytechnic Society of the West
Riding of Yorkshire. Leeds.
- W. Yorks. P. Gl. S.** { 1839— B.M.i.; Camb.U.i.; Dub.R.D.S.; Edinb.R.S.i.; Geol.M.;
Geol.S.i.; N.H.M.i.; Oxon.R.; P.O.i.; R.S.i.; U.C.L.i.
See **Yorks. Gl. S. P.**
- Yn Lloar Manninagh** ... Yn Lloar Manninagh. The Journal of the Isle of Man Natural
History and Antiquarian Society. Douglas.
- 1894— Geol.M.; Geol.S.i.; N.H.M.

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- Yorks. Gl. S. P.** See **W. Yorks. Gl. S. P.**
- Zach Cor.** Correspondance Astronomique, Géographique, Hydrographique et Statistique; von Zach. Gènes.
1818—26. B.M.; R.A.S.; R.S.
- Zach M. Cor.** Monatliche Correspondenz zur Beförderung der Erd- und Himmels-Kunde; von Zach. Gotha.
1800—13. Oxon.B.; R.A.S.; R.S.; U.C.L.
- Z. Al. Erdk.** Zeitschrift für allgemeine Erdkunde. Berlin.
1853—65. [*Continued as:* Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1866—] B.M.; Camb.U.; Dub.R.D.S.; Dub.R.I.A.; Dub.T.C.; Geol.S.i.; Glasg.P.S.i.; Glasg.U.i.; N.H.M.; Oxon.B.; R.Geogr.S.; R.S.; S.K.
- Z. Angew. C.** Zeitschrift für Angewandte Chemie. Berlin.
1888— [*Continuation of:* Zeitschrift für die Chemische Industrie, 1887.] B.M.; Chem.S.; Edinb.U.; Glasg.P.S.; Glasg.U.; Oxon.R.i.; P.O.
- Z. Angew. Mkr.** Zeitschrift für Angewandte Mikroskopie. Berlin, Leipzig, Weimar.
1896— Glasg.P.S.i.; N.H.M.; P.O.
- Z. Anorg. C.** Zeitschrift für Anorganische Chemie. Hamburg, Leipzig.
1892— Camb.P.S.; Camb.U.; Chem.S.; Dub.R.C.S.; Edinb.U.; Glasg.U.; N.H.M.; Oxon.R.i.; Pharm.S.; P.O.; S.K.; U.C.L.
- Zantedeschi A. Fis.** Annali di Fisica; Zantedeschi. Padova.
1849—50. B.M.; Glasg.P.S.i.; R.S.
- Z. Az.** Zoologischer Anzeiger; Carus. Leipzig.
1878— B.M.; Camb.U.; Edinb.R.S.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; Linn.S.i.; N.H.M.; Oxon.R.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
- Z. Bauw.** Zeitschrift für Bauwesen; herausg. unter Mitwirkung der königl. technischen Bau-Deputation und des Architekten-Vereins zu Berlin. Berlin.
1851— B.M.; Camb.U.i.; I.CE.; P.O.; S.K.i.
- Z. Berg.-H.-Salw.** Zeitschrift für das Berg-, Hutten-, und Salinenwesen in dem Preussischen Staate. Berlin.
1854— B.M.; I.CE.; P.O.; S.K.
- Z. Bl.** Zeitschrift für Biologie. München.
1865— B.M.; Camb.U.i.; Chem.S.i.; Edinb.U.i.; Glasg.U.i.; Oxon.R.; R.C.Surg.; R.S.; U.C.L.
- Z. C.** Zeitschrift für Chemie. Leipzig.
1865—71. [*Continuation of:* Zeitschrift für Chemie und Pharmacie, 1860—64.] B.M.; Camb.U.; Chem.S.; Dub.R.D.S.; Glasg.P.S.i.; N.H.M.; Oxon.R.i.; P.O.; R.S.i.; S.K.
- Z. C. In.** Zeitschrift für die Chemische Industrie. Berlin.
1887. [*Continuation of:* Repertorium der Analytischen Chemie, 1881—87.] [*Continued as:* Zeitschrift für Angewandte Chemie, 1888—] B.M.; Chem.S.; Glasg.P.S.i.; P.O.
- Zeeuw. Gn. N. Vh.** Nieuwe Verhandelingen van het Zeeuwisch Genootschap der Wetenschappen. Middelburg.
1807—35. B.M.; Camb.U.i.; N.H.M.; Oxon.B.; R.S.
- Z. Elektch.** Zeitschrift für Elektrochemie. Halle a. S.
1895— [*Continuation of:* Zeitschrift für Elektrotechnik und Elektrochemie, 1894—95.] Camb.P.S.i.; Camb.U.; Chem.S.; Glasg.P.S.i.; Glasg.U.i.; Oxon.R.i.; P.O.; S.K.; U.C.L.
- Z. Elekttech. Elektch.** Zeitschrift für Elektrotechnik und Elektrochemie. Halle a. S.
1894—95. [*Continued as:* Zeitschrift für Elektrochemie, 1895—] Camb.U.; Chem.S.; Glasg.P.S.i.; P.O.; S.K.; U.C.L.
- Z. Ethnl.** Zeitschrift für Ethnologie. Berlin.
1869— B.M.; Camb.U.; Dub.N.L.I.; Dub.R.D.S.; Dub.R.I.A.; Edinb.U.; N.H.M.i.; Oxon.B.; Oxon.R.; R.C.Surg.; U.C.L.
- Z. Hyg.** Zeitschrift für Hygiene [und Infectiouskrankheiten]. Leipzig.
1886— B.M.; Camb.U.; Chem.S.i.; Edinb.U.; Glasg.U.i.; I.CE.i.; Oxon.R.; P.O.i.; R.C.Surg.; R.S.; S.K.; U.C.L.i.
- Z. Instk.** Zeitschrift für Instrumentenkunde. Organ für Mittheilungen aus dem gesammten Gebiete der wissenschaftlichen Technik. Berlin.
1881— B.M.; Camb.U.; Chem.S.; Edinb.U.; Oxon.R.; P.O.; R.A.S.; R.S.; S.K.; U.C.L.i.

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- Živa** *Živa: Časopis prirodničky. Prazě (Prag).*
1853—68. B.M.; Linn.S.i.; N.H.M.
- Z. Kr.** Zeitschrift für Krystallographie und Mineralogie. Leipzig.
1877— B.M.; Camb.U.; Chem.S.; Dub.N.L.I.i.; Edinb.R.S.;
Edinb.U.i.; Geol.M.; Geol.S.; N.H.M.; Oxon.R.; P.O.; R.S.;
S.K.
- Z. Mth. Ps.** Zeitschrift für Mathematik und Physik; Schlömilch. Leipzig.
1856— B.M.; Camb.U.; Dub.N.L.I.i.; Dub.R.D.S.i.; Dub.R.I.A.i.;
Dub.T.C.i.; Edinb.U.; Glasg.U.i.; Math.S.i.; Oxon.B.(R.); R.S.;
S.K.; U.C.L.i.
- Z. Nw.** See **Schlömilch Z.**
Zeitschrift für die gesammten Naturwissenschaften; herausgegeben
von dem Naturwissenschaftlichen Vereine für Sachsen und
Thüringen in Halle; Giebel. Berlin.
1853— [*Continuation of: Jahresbericht des Naturwissenschaftlichen
Vereins, 1848—52.*] B.M.; Camb.U.i.; Dub.N.L.I.i.; Dub.R.D.
S.i.; Dub.R.I.A.i.; Dub.T.C.i.; Edinb.R.S.; Linn.S.; N.H.M.;
Oxon.B.; Oxon.R.; R.S.; S.K.
- Z. Ohrh.** See **Halle Z.**
Zeitschrift für Ohrenheilkunde. Wiesbaden.
1879— [*Continuation of: Archiv für Augen- und Ohrenheilkunde,*
1869—78.] B.M.; Camb.U.; R.C.Surg.i.
- Z. Pl. C.** Zeitschrift für Physiologische Chemie. Strassburg.
1877— Camb.U.; Chem.S.; Dub.N.L.I.i.; Edinb.U.; Glasg.U.;
Oxon.R.; Pharm.S.; P.O.i.; R.C.Surg.; S.K.; U.C.L.
- Z. Ps. C.** Zeitschrift für Physikalische Chemie, Stöchiometrie und Ver-
wandtschaftslehre. Leipzig.
1887— B.M.; Camb.P.S.; Camb.U.; Chem.S.; Dub.N.L.I.i.;
Dub.R.C.S.i.; Edinb.U.; Glasg.U.; N.H.M.; Oxon.R.i.; P.O.i.;
R.C.Surg.; R.S.; S.K.; U.C.L.
- Z. Psychol.** Zeitschrift für Psychologie und Physiologie der Sinnesorgane.
Hamburg, Leipzig.
1890— B.M.; Camb.U.; Edinb.U.; Glasg.U.; Oxon.B.; Oxon.R.;
R.C.Surg.; R.S.; U.C.L.
- Zür. Mschr.** Monatsschrift des Wissenschaftlichen Vereins in Zürich; Hitzig, etc.
Zürich.
1856—59. B.M.; Camb.U.; N.H.M.; Oxon.B.; R.S.
- Zür. Mt.** Mittheilungen der Naturforschenden Gesellschaft in Zürich. Zürich.
1847—56. Chem.S.i.; Dub.R.I.A.i.; Edinb.R.S.i.; Linn.S.; N.H.M.;
R.A.S.; R.Geogr.S.i.; R.S.; S.K.
- Zür. N. D. Sch. Gs.** Neue Denkschriften der allgemeinen Schweizerischen Gesellschaft
für die gesammten Naturwissenschaften. Neuchâtel, Zurich, etc.
1837— B.M.; Camb.P.S.; Camb.U.; Dub.R.D.S.i.; Dub.R.I.A.i.;
Edinb.R.S.; Geol.S.i.; Linn.S.i.; N.H.M.; Oxon.B.; R.C.Surg.i.;
R.S.; S.K.
- Zür. Nf. Gs. Njbl.** See **Sch. Gs. N. D.**
An die Zürcherische Jugend... von der Naturforschenden Gesellschaft.
Zürich.
1799—1870. [*Continued as: Neujahrsblatt herausgegeben von der
Naturforschenden Gesellschaft in Zürich, 1871—*] Camb.P.S.;
Camb.U.i.; N.H.M.; R.S.
- Zür. Ps. Gs. Jbr.** Jahresbericht der Physikalischen Gesellschaft in Zürich. Uster-
Zürich.
1887— R.S.
- Zür. Vjschr.** Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich.
Zürich.
1856— B.M.; Camb.P.S.; Camb.U.i.; Chem.S.i.; Dub.R.I.A.i.;
Edinb.R.S.; Linn.S.i.; Math.S.i.; N.H.M.; R.A.S.; R.Geogr.S.i.;
R.S.; S.K.
- Z. Vr. D. Zuckin.** Zeitschrift des Vereins der Deutschen Zucker-Industrie. Berlin.
1898— [*Continuation of: Zeitschrift des Vereins für die Rüben-
zucker-Industrie, 1851?—97.*] Chem.S.; Glasg.P.S.i.; P.O.
- Z. Vr. Rübenzuckin.** Zeitschrift des Vereins für die Rübenzucker-Industrie des Deutschen
Reichs. Berlin.
1851?—97. [*Continued as: Zeitschrift des Vereins der Deutschen
Zucker-Industrie, 1898—*] Chem.S.i.; P.O.i.

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| Zwick. Vr. Nt. Jbr. | Jahresbericht des Vereins für Naturkunde zu Zwickau. Zwickau. 1874— N.H.M.; R.S.i. |
| Zwolle Vooruitgang | De Vooruitgang; Tijdschrift voor Wetenschap, etc. Zwolle. 1851—53. B.M.; Glasg.P.S.i. |
| Z. Ws. Mkr. | Zeitschrift für Wissenschaftliche Mikroskopie und für Mikro- skopische Technik. Braunschweig, Leipzig. 1884— B.M.; Edinb.U.; Glasg.P.S.i.; Glasg.U.; N.H.M.; Oxon.R.; P.O.; R.C.Surg.; R.S.; S.K.; U.C.L.i. |
| Z. Zuckin. | Zeitschrift für Zuckerindustrie. Prag. 1872—74. Chem.S.; P.O. |
| Z. Zuckin. Böhm. | Zeitschrift für Zuckerindustrie in Böhmen. Prag. 1876— Chem.S.; P.O.i. |

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- Bunsen, *Robert Wilhelm Eberhard*. A. di Fm. e C. (1899) 479-; Am. C. J. 22 (1899) 411-; Am. J. Sc. 8 (1899) 318; Anal. 24 (1899) 226-; Asps. J. 10 (1899) 301-; Berl. B. 32 (1899) 2535-; C. N. 80 (1899) 94-; C. R. 129 (1899) 1061; C. Ztg. 23 (1899) 675; Dingler 313 (1899) 159-; Elekttech. Z. 20 (1899) 626; Erkt. a. M. Ps. Vr. Jbr. (1898-99) 43-; Lpldina. 35 (1899) 158; Mon. Sc. 13 (1899) 770; Nt. 60 (1899) 424-; Ps. Rv. 9 (1899) 310-; Rm. R. Ac. Linc. Rd. 8 (1899) (*Sem.* 2) 329-; Rv. Sc.-Ind. 31 (1899) 184; S. Afr. C. Mtl. S. J. 2 (1899) 178-; S. Afr. C. Mtl. S. P. 2 (1897-99) 832-; Science 10 (1899) 447-; Smiths. Rp. (1899) 605-; Wien. Md. Wschr. 49 (1899) 1596; Wien Pht. Cor. 36 (1899) 550-; Z. Angew. C. (1899) 822, 1241; (1900) 884; Am. C. S. J. 22 (1900) (*P.*) 89-; C. S. J. 77 (1900) (*Pt.* 1) 513-; Gl. Mg. 7 (1900) 431; Gl. S. Q.J. 56 (1900) (*P.*) li; L. Ps. S. P. 17 (1901) (*Ann. Meet.* 1900) 12-; Manch. Lt. Ph. S. Mm. & P. 44 (1900) xxxii-; R. S. Yearbook (1900) 198-; Term. Kōzl. 32 (1900) 690-; Wien Alm. 50 (1900) 286-; Z. Anorg. C. 23 (1900) 393-; Z. Elektch. (1899-1900) 205-; Münch. Ak. Sb. 30 (1901) 359-; R. I. P. 16 (1902) 437-.
- Burton, *William Kinninmond*. I. CE. P. 139 (1900) 373-; Phot. J. 24 (1900) 89.
- Buys-Ballot, *Christopher Hendrik Dirk*. Am. Met. J. 6 (1889-90) 583; Berl. Ps. Gs. Vh. (1890) 19-; Brux. Ac. Bil. 19 (1890) 180-; Humb. 9 (1890) 104; Lpldina. 26 (1890) 58; Manch. Lt. Ph. S. Mm. & P. 3 (1890) 167-; Moncalieri Oss. Bil. 10 (1890) 34; Nt. 41 (1890) 371; Ciel et Terre 11 (1890-91) 21; Met. S. Q.J. 17 (1891) 61-; Met. Z. 8 (1891) 1-; Sym. Met. Mg. 25 (1891) 8; Term. Kōzl. 23 (1891) 630-; Ts. Ps. C. 30 (1891) 63-; Brux. S. As. Bil. 3 (1898) 204-; Amst. Ak. Jb. (1899) 59-.
- Byrgi, *Jost*. Cztg. Opt. 7 (1886) 121-.
- Cabanellas, *Gustave Eugène*. Lum. Elect. 30 (1888) 98; Par. Ing. Civ. Mm. (1888) (*Pt.* 2) 644-.
- Caligny, *Anatole François Hile (marquis) de*. C. R. 114 (1892) 797-; Gen. S. Ps. Mm. 31 (1890-93) cxxxix-.
- Campbell, *George*. Eng. S. T. (1889) 219.
- Cantoni, *Giovanni*. N. Cim. 6 (1897) 425-; Nap. Rd. 37 (1898) 46-; Mil. I. Lomb. Rd. 32 (1899) 57-.
- Cantzier, *Gustav Hermann*. St. Pet. Md. Wschr. 21 (1896) 68.
- Carl, *Philipp Franz Heinrich*. Elekttech. Z. 12 (1891) 97-; Exner Rpm. 27 (1891) 65-; Lpldina. 27 (1891) 45-; Term. Kōzl. 24 (1892) 641.
- Carlsund, *Otto Edvard*. Stockh. Vt. Ak. Lefn. 3 (1886-94) 161-.
- Carpenter, *William Lant*. C. S. J. 59 (1891) 461-; Elect. 26 (1891) 266; L. Ps. S. P. 11 (1892) (*Ann. Meet.* 1891) 9; Nt. 43 (1891) 230; S. C. In. J. 10 (1891) 33.
- Carré, *Edmond*. Elekttech. Z. 15 (1894) 370.

- Carstädt, *Friedrich*. Bresl. Schl. Gs. Jbr. (1891) (*Nek.*) 4.
- Casati, *Victor*. Wien Ph. Cor. 31 (1894) 361-.
- Caselli, (*abate*) *Giovanni*. Firenze Ac. Georg. At. 14 (1891) XLVI-; Lpldina. 27 (1891) 204; Lum. Elect. 42 (1891) 196; Rv. Sc.-Ind. 23 (1891) 251-; Term. Közl. 24 (1892) 641; Ts. Ps. C. 31 (1892) 128.
- Cauchy, (*le baron*) *Augustin Louis*. J. Sav. (1869) 205-; Rv. Sc. 9 (1898) 97-.
- Cecchi, (*padre*) *Filippo*. Moncalieri Oss. Bll. 7 (1887) 81-; Rm. N. Linc. At. 40 (1887) 163-; Rv. Sc.-Ind. 19 (1887) 133-; Ven. Aten. 1 (1888) 3-.
- Cecil, (*Lord*) *Sackville Arthur*. L. Ps. S. P. 16 (1899) (*Ann. Meet.* 1898) 6-; I. Elect. E. J. 28 (1899) [665]-.
- Cellérier, *Charles*. Gen. S. Ps. Mm. 31 (1890-93) XVIII-.
- Challis, *James*. As. S. M. Not. 43 (1883) 160-; Obs. 6 (1883) 23.
- Chamontov, *Nikolaj Nikolaevič*. Rs. Ps.-C. S. J. 25 (*Ps.*) (1893) 196-.
- Chamousset, (*le chanoine*) *François Marie*. Sav. Ac. Mm. (1891) 111-.
- Chapman, *Daniel Currier*. Wash. Ph. S. Bll. 13 (1900) 381-.
- Chase, *Pliny Earle*. Am. Ph. S. P. 19 (1882) 184-; 24 (1887) 287-; Franklin I. J. 124 (1887) 229-.
- Chasles, *Michel*. Bologna Rd. (1881) 37-; Khar- kov Mth. S. Com. (1881) 23-; Kosmos (Lw.) 6 (1881) 555-; R. S. P. 32 (1881) i-; Rv. Quest. Sc. 9 (1881) 517-; Rv. Sc. 50 (1892) 801-.
- Christie, *Samuel Hunter*. R. S. P. 15 (1867) xi-.
- Churchod, *Louis*. Lum. Elect. 34 (1889) 296.
- Clark, *Daniel Kinnear*. Am. Eng. & Railroad J. 70 (1896) 44-; I. CE. P. 124 (1896) 409-; I. ME. P. (1896) 92-.
- Clark, *Joseph Warner*. L. Ps. S. P. 7 (1886) (*Ann. Meet.* 1886) 10-.
- Clark, *Josiah Latimer*. Elect. Rv. 43 (1898) 663-; Elekttech. Z. 19 (1898) 777-; J. Tél. 22 (1898) 278; Lpldina. 34 (1898) 170; Science 8 (1898) 704-; As. S. M. Not. 59 (1899) 219-; Elect. 42 (1899) 33; I. CE. P. 137 (1899) 418-; I. Elect. E. J. 27 (1899) 646-, 649-; 28 (1899) 667-; L. Ps. S. P. 16 (1899) (*Ann. Meet.* 1899) 9-; Nt. 59 (1898-99) 38.
- Claudet, *Antoine François Jean*. R. S. P. 17 (1869) lxxxv-.
- Clausius, *Rudolph Julius Emmanuel*. A. Tél. 15 (1888) 478; C. Ztg. 12 (1888) 1141; Elect. 21 (1888) 562; Humb. 7 (1888) 403; Lpldina. 24 (1888) 170; Lum. Elect. 29 (1888) 496-; Nt. 38 (1888) 438-; Rv. Sc. 42 (1888) 424-; Rv. Sc.-Ind. 20 (1888) 259-; Am. Ac. P. 24 (1889) 458-; Berl. Ps. Gs. Vh. (1889) 1-; Glasg. I. Eng. T. 32 (1889) 319-; Gött. Ab. 35 (1889) (*Mth.*) 39 pp.; I. CE. P. 96 (1889) 307-; L. Ps. S. P. 10 (1890) (*Ann. Meet.* 1889) 10-; Manch. Lt. Ph. S. Mm. & P. 2 (1889) 259-; Phm. J. 19 (1889) 243; Term. Közl. 21 (1889) 600; Tor. Ac. Sc. At. 24 (1889) 3-; Wien Alm. 39 (1889) 203-; Münch. Ak. Sb. 19 (1890) 113-; Rv. Quest. Sc. 27 (1890) 419-; R. S. P. 48 (1891) i-; Zür. Vjschr. 41 (1896) (*Festschr.*, Th. 1) 93-.
- Clerc, *Auguste*. Par. Ing. Civ. Mm. (1888) (*Pt.* 2) 530.
- Colladon, *Jean Daniel*. C. R. 117 (1893) 263-; Gén. Civ. 23 (1893) 194; J. Tél. 17 (1893) 182-; Lum. Elect. 49 (1893) 142-; Nt. 48 (1893) 396-; Par. Ing. Civ. Mm. (1893) (*Pt.* 2) 443-; Sch. Nf. Gs. Vh. (1893) 183-; Met. S. QJ. 20 (1894) 106-; Gen. S. Ps. Mm. 32 (1894-97) (*Pt.* 1) XVIII-.
- Collette, *Johannes Martinus*. Elekttech. Z. 21 (1900) 104; 's Gravenh. I. Ing. Ts. (1899-1900) (*Verg.*) 61-.
- Colley, *Robert Andreevič*. Kazan S. Ps.-Mth. Bll. 1 (1891) (*Prot.*) 61-; Rs. Ps.-C. S. J. 23 (*Ps.*) (1891) 443-.
- Commines de Marsilly, (*le gén.*) *Louis Joseph Auguste de*. Bône Ac. Hip. Bll. 24 (1891) (*C. R.* 1890) 1-.
- Conroy, (*Sir*) *John*. Nt. 63 (1900-01) 186.
- Cook, *Edward Rider*. S. C. In. J. 17 (1898) 828.
- Cooper, *Matthew*. I. Elect. E. J. 29 (1900) 948-.
- Copeland, *Charles W.* Am. Eng. & Railroad J. 69 (1895) 140.
- Cordier, *Pierre Louis Antoine*. A. Mines 8 (1895) 599-.
- Cornélis, *Louis*. Anvers J. Phm. 43 (1887) 444-.
- Cornelius, *Karl Sebastian*. Lpldina. 32 (1896) 188.
- Cornut, *Ernest*. Gén. Civ. 20 (1891-92) 203.
- Cowles, *Eugene H.* Elect. 29 (1892) 61; Franklin I. J. 133 (1892) 404-.
- Cowper, *Edward Alfred*. Elect. 31 (1893) 67; I. CE. P. 114 (1893) 369-; I. ME. P. (1893) 203-; I. & S. I. J. (1893) (*No.* 1) 172-; Nv. Archt. T. 34 (1893) 241-; S. C. In. J. 12 (1893) 509.
- Cracknell, *Edward Charles*. I. CE. P. 113 (1893) 343-; N. S. W. R. S. J. 27 (1893) 3.
- Crampton, *Thomas Russell*. I. CE. P. 94 (1888) 295-; I. ME. P. (1888) 437-; I. & S. I. J. (1888) (*No.* 1) 210-; Par. Ing. Civ. Mm. (1888) (*Pt.* 1) 668-; Railroad & Eng. J. 62 (1888) 285.
- Curbillon, *Claudius*. Angers S. Sc. Bll. (1899) 262-.
- Curioni, *Giovanni*. Rv. Sc.-Ind. 19 (1887) 39-.
- Cushman, *Holbrook*. Science 2 (1895) 757-.
- Czöglér, *Alajos*. Term. Közl. 26 (1894) 638.
- Daalen, *Gotfried Coenraad Ernst van*. 's Gravenh. I. Ing. Ts. (1889-90) (*Verg.*) 4.
- Dagron, *Prudent René Patrice*. Aér. (1900) 152-.
- Daguin, *Pierre Adolphe*. Toul. Ac. Sc. Mm. 7 (*Sem.* 2) (1885) 48-.
- Dale, (*Rev.*) *T. Pelham*. L. Ps. S. P. 12 (1894) (*Ann. Meet.* 1893) 8.
- Dalton, *John*. Arch. Phm. 90 (1844) 321-; S. Dyers Col. J. 16 (1900) 74-, 104-.
- Dancer, *John Benjamin*. As. S. M. Not. 48 (1888) 161; Manch. Lt. Ph. S. Mm. & P. 1 (1888) 149-.
- Davies, *John Eugene*. Am. Mer. S. T. 21 (1900) 249-.
- Davy, *Edward*. Vict. R. S. T. 21 (1885) 150-.
- Decaux, *Charles Auguste*. Gén. Civ. 34 (1898-99) 61.
- Delabar, *Gangolf*. Sch. Nf. Gs. Vh. (1883-84) 148-.

- Delarive [De la Rive], *Auguste Arthur*. Gen. S. Ps. Mm. 23 (1874) 465-; Edinb. R. S. P. 8 (1875) 319-; Rv. Sc. 8 (1875) 648-; R. S. P. 24 (1876) xxxvii-; Arch. Sc. Ps. Nt. 60 (1877) 5-.
- De La Rue, *Warren*. Am. J. Phm. 61 (1889) 319; Berl. B. 22 (1889) 1169-; C. Ztg. 13 (1889) 545; Elect. 22 (1889) 709-; Lp'dina. 25 (1889) 113; Lum. Elect. 32 (1889) 241-; Nt. 40 (1889) 26-; Obs. 12 (1889) 244-; Phm. J. 19 (1889) 879; S. C. In. J. 8 (1889) 269; As. S. M. Not. 50 (1890) 155-; C. S. J. 57 (1890) 441-; L. Ps. S. P. 10 (1890) (*Ann. Meet.* 1890) 13-; Met. S. Q. J. 16 (1890) 99; Ts. Ps. C. 29 (1890) 61.
- Delezenne, *Charles*. Lille S. Mm. 3 (1867) 493-.
- Della Casa, *Lorenzo*. Bologna Ac. Sc. Mm. 1 (1871) 245-.
- Delsaulx, (*le rév. père*) *Joseph*. Brux. S. Sc. A. 15 (1891) (*Pt. 1*) 86-; Rv. Quest. Sc. 29 (1891) 585-.
- Denier, *Heinrich*. Wien Pht. Cor. 29 (1892) 214-.
- Dent, *Montagu Charles*. I. Elect. E. J. 29 (1900) 949.
- Desains, *Quentin Paul*. C. R. 100 (1885) 1257-.
- Despeyrous, *Théodore*. Toul. Ac. Sc. Mm. 7 (*Sem. 2*) (1885) 100-.
- Despretz, *César*. R. S. P. 13 (1864) viii-.
- Discher, *Heinrich*. J. Tél. 16 (1892) 291.
- Donkin, *William Frederick*. Gg. S. P. 10 (1888) 715-; C. S. J. 55 (1889) 292-; Phot. J. 13 (1889) 44-.
- Donny, *François Marie Louis*. Brux. Ac. Bll. 32 (1896) 496-.
- Doubrava, *Stefan*. Elekttech. Z. 18 (1897) 491.
- Douglass, (*Sir*) *James Nicholas*. Eng. S. T. (1898) 238; I. CE. P. 134 (1898) 403-; I. ME. P. (1898) 531-; Nt. 58 (1898) 177; I. Elect. E. J. 28 (1899) 672-.
- Doyle, *James Drummond*. I. Elect. E. J. 29 (1900) 949-.
- Draper, *Henry*. Am. J. Sc. 25 (1883) 89-; Obs. 6 (1883) 23-; Science 1 (1883) 29-.
- Draper, *John William*. Am. J. Sc. 23 (1882) 163-; L. Ps. S. P. 5 (1884) (*Ann. Meet.* 1882) 8-.
- Dresing, *Peter Christian*. I. Elect. E. J. 28 (1899) 672-.
- Drobisch, *Moritz Wilhelm*. Leip. Mth. Ps. B. 48 (1896) 697-.
- Droop, *Henry Richmond*. L. Ps. S. P. 6 (1885) (*Ann. Meet.* 1885) 8-.
- Drummond, *Richard Oliver Gardner*. I. CE. P. 134 (1898) 414-; I. ME. P. (1898) 533; I. Elect. E. J. 28 (1899) 673.
- Du Bois-Reymond, *Emil*. C. Ztg. 20 (1896) 1035; Am. Ntlist. 31 (1897) 268-; Arch. An. Pl. (*Pl. Ab.*) (1897) vii-; Berl. Ps. Gs. Vh. (1897) 5-; Bl. Cb. 17 (1897) 81-; Elect. 38 (1897) 316-; Elekttech. Z. 18 (1897) 10-; Gen. S. Ps. Mm. 32 (1894-97) *Pt. 2*, lxi-; Lp'dina. 33 (1897) 50-; Manch. Lt. Ph. S. Mm. & P. 41 (1897) xlviii-; Nt. 55 (1896-97) 230-; Rv. Sc. 7 (1897) 385-; Rv. Sper. Freniatr. 23 (1897) 255; Science 5 (1897) 217-; St. Pét. Ac. Sc. Bll. 6 (1897) v-; Vars. S. Nt. Tr. (1897) (*Bl.*) No. 3, 2-; Wien Alm. 47 (1897) 318-; Berl. Ak. Ab. (1898) 24 pp.; Lüneb. Nt. Vr. Jh. 14 (1898) xxxi-; Münch. Ak. Sb. 27 (1898) 423-.
- Ducoté, *Jules*. A. Tél. 11 (1884) 538-.
- Dufour, *Louis*. Gen. S. Ps. Mm. 81 (1890-93) cxi-; Laus. S. Vd. Bll. 29 (1893) 211-; Met. Z. 10 (1893) 432.
- Dufourcet, *Eugène*. Dax S. Borda Bll. (1900) 37-.
- Duhamel, *Jean Marie Constant*. Ts. Mth. 2 (1872) 143-.
- Dumas, *Jean Baptiste André*. A. di C. 78 (1884) 269-; Am. Ac. P. 19 (1884) 545-; Am. J. Sc. 28 (1884) 289-; Anvers J. Phm. 40 (1884) 180-; A. Tél. 11 (1884) 181-; Berl. B. 17 (1884) 947- (*Ref.*) 629-; C. N. 49 (1884) 193; C. R. 98 (1884) 933-; 100 (1885) 477-; C. Ztg. 8 (1884) 539, 569-; Frkf. a M. Ps. Vr. Jhr. (1883-84) 30-; Gén. Civ. 4 (1883-84) 397-; 5 (1884) 409-, 434-; J. Phm. 9 (1884) 369-; Les Mondes 7 (1884) 607-; Lp'dina. 20 (1884) 114; N. Antol. Sc. 74 (1884) 772; Nt. 30 (1884) 15-; Par. S. C. Bll. 42 (1884) 130-, 549-; 45 (1886) i-, 1-; Phm. J. 14 (1884) 847-; Rm. R. Ac. Linc. T. 8 (1884) 251-; R. S. P. 37 (1884) x-; Sch. Nf. Gs. Vh. (1883-84) 154-; Science 3 (1884) 750-; Tel. J. 14 (1884) 369; Ts. Ps. C. 23 (1884) 218-; Wien Alm. 34 (1884) 200-; Bordeaux S. L. Act. 39 (1885) xiii-; C. S. J. 47 (1885) 310-; Rv. Bt. 3 (1884-85) 288; Termt. Kōzl. 17 (1885) 499; Münch. Ak. Sb. 15 (1886) 136-; Rv. Sc. 44 (1889) 673-.
- Du Moncel, (*le comte*) *Théodore Achille Louis*. A. Tél. 11 (1884) 83-; C. R. 98 (1884) 453-; 100 (1885) 481; Elect. 12 (1884) 373; Les Mondes 7 (1884) 365-; Lum. Elect. 11 (1884) 341, 381-; Nt. 29 (1884) 412-; Tel. J. 14 (1884) 155-.
- Duprez, *François*. Brux. Ac. Bll. 7 (1884) 708-.
- Dutilleul, *Jules*. Lille S. Mm. 14 (1885) 379-.
- Dyer, *Ezra*. Am. Oph. S. T. (1887) 407-.
- Edlund, *Eric*. Elect. 21 (1888) 595-; Lp'dina. 24 (1888) 169-; Lum. Elect. 29 (1888) 632-; Helsingf. Öfv. 31 (1889) 247-; Stockh. Vt. Ak. Lefn. 3 (1886-94) 281-.
- Eickemeyer, *Rudolf*. Elekttech. Z. 16 (1895) 117-.
- Einsle, *Anton*. Wien Pht. Cor. 34 (1897) 571-.
- Eisenlohr, *Wilhelm*. Leip. As. Gs. Vjschr. 7 (1872) 263-; Karlsruhe Nt. Vr. Vh. 13 (1900) (*Ab.*) 458-.
- Elliot, (*Sir*) *George*. Elekttech. Z. 15 (1894) 28; I. CE. P. 116 (1894) 355-; I. & S. I. J. (1894) (*No. 1*) 390-.
- Ellis, *Alexander John*. L. Mth. S. P. 21 (1891) 457-; Nt. 43 (1891) 20; R. S. P. 49 (1891) i-.
- Elsas, *Adolf*. Lp'dina. 31 (1895) 109-.
- Emery, *Charles Edvard*. Am. Eng. & Railroad J. 72 (1898) 234; I. CE. P. 133 (1898) 395-; Am. S. CE. T. 42 (1899) 558-; Am. I. Mn. E. T. 29 (1900) xxviii-.
- Enys, *John Samuel*. Cornwall Gl. S. T. 9 (1878) (*Rp.* 59) 9-.

- Epstein, *Ludwig*. I. Elect. E. J. 29 (1900) 950-.
- Ericsson, (*Capt.*) *John*. Mæx. Obs. Bl. 2 (1889) 394-; Nt. 39 (1889) 466, 517; Railroad & Eng. J. 63 (1889) 151-; Science 13 (1889) 189-; Stockh. Vt. Ak. Lefn. 3 (1886-94) 355-.
- Erkel, *F. van*. 's Gravenh. I. Ing. Ts. (1899-1900) (*Verg.*) 62.
- Euler, *Leonhard*. Basel Vh. 7 (1885) (*Anh.*) 39-; Barcel. Ac. Mm. 1 (1892-1900) 241-.
- Éval'd, *Theodor Theodorovich*. Rs. Ps.-C. S. J. 11 (*Ps.*) (1879) [*Pt.* 1] 117-.
- Evans, (*Capt. Sir*) *Frederick John Owen*. As. S. M. Not. 46 (1886) 183-; Elect. 16 (1886) 127-; Gg. S. P. 8 (1886) 112-; Lpldina. 22 (1886) 57; Nt. 33 (1886) 246-; R. S. P. 40 (1886) i-.
- Falke, *Jacob von*. Wien Pht. Cor. 34 (1897) 372.
- Fambri, *Paulo*. N. Antol. Sc. 153 (1897) 131-; Ven. I. At. (1897-98) 319-.
- Faraday, *Michael*. Am. J. Phm. 39 (1867) 576-; Arch. Sc. Ps. Nt. 30 (1867) 131-; Ph. Mg. 34 (1867) 409-; Smiths. Rp. (1867) 227-; Am. J. Sc. 45 (1868) 145-; Münch. Sb. (1868) (1) 439-; N. Cim. 28 (1868) 79-; Rec. Mth. (Moscou) 3 (1868) (*Pt.* 2) 17-; Par. Bl. S. C. 12 (1869) 172-; R. I. P. 5 (1869) 199-; R. S. P. 17 (1869) i-; Mag. Tud. Ak. Étk. (*Term.*) 1 (1870) (*No.* 10) 16 pp.; Par. Ac. Sc. Mm. 36 (1870) vii-; Md. Chir. S. P. 6 (1872) 53-; Am. Ac. P. 8 (1873) 31-; Elect. 19 (1887) 140-.
- Farmer, *Moses Gerrish*. Am. Ac. P. 29 (1894) 415-.
- Fasoldt, *Chas*. Mer. S. J. (1889) 829-.
- Fawcett, *Henry*. J. Tél. 8 (1884) 235-.
- Fechner, *Gustav Theodor*. Lpldina. 23 (1887) 217-; Lum. Élect. 26 (1887) 492; Humb. 7 (1888) 84; Ph. Stud. 4 (1888) 471-; Wien Alm. 38 (1888) 196-.
- Feilitzsch, *F. K. O. (Frhr.) von*. Term. Közl. 18 (1886) 516.
- Fein, *Wilhelm Emil*. Dingler 310 (1898) 40; Elekttech. Z. 19 (1898) 716.
- Ferraris, *Galileo*. Elect. 38 (1897) 497; Elekttech. Z. 18 (1897) 99; Lpldina. 33 (1897) 54; N. Cim. 5 (1897) 231-; Par. Poids et Mes. P.V. (1897) 6-; Ps. Rv. 4 (1897) 505-; Rm. R. Ac. Linc. Rd. 6 (1897) (*Sem.* 1) 189-; Rv. Sc. Ind. 29 (1897) 102-; Tor. Ac. Sc. Mm. 47 (1897) 143-; Ven. I. At. (1896-97) 239-; Term. Közl. 30 (1898) 648.
- Field, *Cyrus W.* J. Tél. 16 (1892) 221; Lum. Élect. 45 (1892) 196.
- Fievez, *Charles*. Ciel et Terre 10 (1889-90) 565-; Nt. 41 (1890) 400; Obs. 13 (1890) 124-; Rio Obs. Rv. (1890) 41; Spet. It. Mm. 19 (1891) 17-.
- Fizeau, *Armand Hippolyte Louis*. Am. J. Sc. 2 (1896) 398; Asps. J. 4 (1896) 367-; Elect. 37 (1896) 699-; Lpldina. 32 (1896) 182; Nt. 54 (1896) 523-; N. Ts. Fs. K. 1 (1896) 439-.
- Flachat, *Eugène*. Rv. Sc. 9 (1898) 801-; Science 8 (1898) 14-.
- Fliedner, *Conrad*. Wet. Gs. Nt. B. (1885-87) xxxi-.
- Fodor, *Johann*. Wien Pht. Cor. 27 (1890) 294-.
- Forbes, *James David*. Edinb. Gl. S. T. 1 (1870) 238-; R. S. P. 19 (1871) i-; Edinb. R. S. P. 7 (1872) 11-.
- Forquenot, —. Gén. Civ. 8 (1885-86) 13-.
- Foucault, *Jean Bernard Léon*. Rv. Cours Sc. 6 (1869) 484-; R. S. P. 17 (1869) lxxxiii-; Rv. Quest. Sc. 5 (1879) 108-, 516-; Rv. Sc. 3 (1882) 161-.
- Fox, *Robert Were*. Cornwall Gl. S. T. 9 (1878) (*Rp.* 64) xi-.
- Foy, *Alphonse*. A. Tél. 15 (1888) 5-.
- Frankland, (*Sir*) *Edward*. Am. C. J. 22 (1899) 410-; Anal. 24 (1899) 225-; Berl. B. 32 (1899) 2540-; 33 (1900) 3847-; C. N. 79 (1899) 81-; C. R. 129 (1899) 1060-; C. Ztg. 23 (1899) 697; Lpldina. 35 (1899) 179; Mon. Sc. 13 (1899) 771-; Nt. 60 (1899) 372; S. Afr. C. Mtl. S. J. 2 (1899) 181-; S. Afr. C. Mtl. S. P. 2 (1897-99) 835; S. C. In. J. 18 (1899) 735; Z. Angew. C. (1899) 822-; Manch. Lt. Ph. S. Mm. & P. 44 (1900) xxxviii-; Md.-Chir. T. 83 (1900) cxix; Wien Alm. 50 (1900) 289-; Münch. Ak. Sb. 30 (1901) 373-.
- Fraunhofer, *Joseph von*. Cztg. Opt. 8 (1887) 73-; Z. Instk. 7 (1887) 114-.
- Freeman, (*Rev.*) *Alexander*. Obs. 20 (1897) 293; As. S. M. Not. 58 (1898) 136-; L. Ps. S. P. 16 (1899) (*Ann. Meet.* 1898) 8.
- Fresnel, *Jean Augustin*. C. R. 99 (1884) 451-; Habana Ac. A. 21 (1884) 53-; Les Mondes 9 (1884) 90-.
- Frew, *John*. I. & S. I. J. (1899) (*No.* 2) 293-.
- Frñ, *Jan*. As. Nr. 143 (1897) (*Beil. zu No.* 3415) 2 pp.; Z. Zuckin. Böhm. 21 (1896-97) 396-.
- Frick, *George*. Am. Eng. & Railroad J. 67 (1893) 101-.
- Fripp, *Henry Edward*. Bristol Nt. S. P. 7 (1894) 1-.
- Fristoe, *Edward T.* Wash. Ph. S. Bl. 12 (1895) 460-.
- Froment, *Paul Gustave*. A. Cons. Arts et Mét. 7 (1895) 125-.
- Gaiffe, *Adolphe*. Lum. Élect. 24 (1887) 138-.
- Gaillard, *François Alexandre Narcisse*. A. Tél. [19] (1892) 85-.
- Gallenkamp, *W.* Berl. Ps. Gs. Vh. (1890) 71-.
- Galton, (*Sir*) *Douglas Strutt*. Am. Eng. & Railroad J. 73 (1899) 136; Elect. 42 (1899) 725-; I. CE. P. 137 (1899) 413-; I. Elect. E. J. 28 (1899) 674-; I. M.E. P. (1899) 129-; I. & S. I. J. (1899) (*No.* 1) 262; Nt. 59 (1898-99) 512-; Science 9 (1899) 421; Gl. Mg. 7 (1900) 429-; Met. S. QJ. 26 (1900) 215-.
- Gassiot, *John Peter*. C. S. J. 33 (1878) 227-.
- Gaugain, *Jean Mothée*. A. Tél. 7 (1880) 409-, 513-; 8 (1881) 67-; Caen Ac. Mm. (1881) 3-.
- Gaulard, *Lucien*. Lum. Élect. 30 (1888) 497-; Railroad & Eng. J. 63 (1889) 48.
- Gauss, *Johann Friedrich Karl*. R. S. P. 7 (1856) 589-; Časopis 6 (1877) 145-; Nt. 15 (1877) 533-; 28 (1883) 272-; Term. Közl. 16 (1884) 496-; Science 9 (1899) 697-.

- Gazzeri, *Giuseppe*. Firenze Ac. Georg. At. 26 (1848) 28-; Pisa S. Tosc. At. (*Mm.*) 8 (1887) 77-.
- Géraldy, *Frank*. Elekttech. Z. 14 (1893) 304; Lum. Élect. 48 (1893) 201-.
- Gherardi, *Silvestro*. Tor. Ac. Sc. At. 15 (1879) 369-; Rm. R. Ac. Linc. T. 4 (1880) 16-.
- Gidel, —. A. Tél. 20 (1893) 378.
- Gilbert, *Louis Philippe*. Brux. S. Sc. A. 16 (1892) (*Pt.* 1) 102-; Mathesis 12 (1892) 57; Par. S. Phlm. Bll. 4 (1892) 138-; Rv. Quest. Sc. 31 (1892) 620-; 33 (1893) 591-.
- Gintl, *Julius Wilhelm*. Wien Alm. 34 (1884) 196-.
- Girard, *Philippe de*. Rv. Sc. 40 (1887) 257-.
- Giraud-Teulon, *Mar Antoine Louis Félix*. Arch. Gén. Mdl. 160 (1887) 505-; Lpldina. 23 (1887) 162; A. d'Ocul. 99 (1888) 9-; Par. S. Chir. Bll. et Mm. 15 (1889) 15-.
- Gisborne, —. Lum. Élect. 45 (1892) 634.
- Glan, *Paul*. Berl. Ps. Gs. Vh. (1898) 121-; Lpldina. 34 (1898) 141-.
- Göschl, *Alexander*. Wien Pht. Cor. 37 (1900) 598-.
- Goetz, *George W.* Am. I. Mn. E. T. 27 (1898) 436-.
- Goodwin, *H. Stanley*. Am. Eng. & Railroad J. 67 (1893) 101.
- Goodwin, *John Marston*. Railroad & Eng. J. 65 (1891) 574.
- Gordon, *James Edward Henry*. Elect. 30 (1893) 417-; Elect. Rv. 32 (1893) 159-; I. CE. P. 113 (1893) 346-; Lum. Élect. 47 (1893) 439-.
- Gottschalk, *Philippe Alexandre*. Gén. Civ. 32 (1897-98) 306; I. ME. P. (1898) 312-; I. & S. I. J. (1898) (*No.* 2) 328-; Par. Ing. Civ. Mm. (1898) (*Pt.* 1) 355-.
- Gouin, *Ernest*. Gén. Civ. 6 (1884-85) 370; Par. Ing. Civ. Mm. (1885) (*Pt.* 1) 569-.
- Govi, *Gilberto*. Firenze Ac. Georg. At. 12 (1889) xxxix-; Par. Poids et Mes. P.V. (1889) 10-; Rv. Sc.-Ind. 21 (1889) 176; Tor. Ac. Sc. At. 25 (1890) 10-.
- Gralath, *Daniel*. Danzig Schr. 6 (1884-87) (*Heft* 4) 192-.
- Grawinkel, *Carl*. Elekttech. Z. 15 (1894) 461.
- Gregory, *Walter George*. L. Ps. S. P. 11 (1892) (*Ann. Meet.* 1892) 11.
- Griffith, *Ezra Hollis*. Am. Mer. S. P. 15 (1893) 247-.
- Grinwis, *Cornelis Hubertus Carolus*. Amst. Ak. Vs. 8 (1900) 326.
- Grove, (*Sir*) *William Robert*. Am. J. Sc. 2 (1896) 314; Elect. 37 (1896) 483-; Elect. Rv. 39 (1896) 181; Lpldina. 32 (1896) 137-; Nt. 54 (1896) 393-; I. CE. P. 127 (1897) 358-.
- Grunert, *Johann August*. Arch. Mth. Ps. 55 (1873) 1-; Wien Alm. (1873) 145-.
- Gubkin, *Ivan Sergëevitch*. Mosc. S. Sc. Bll. 78 (*No.* 2) (1893) 64-.
- Guerout, *Auguste*. Lum. Élect. 19 (1886) 433.
- Guibal, *Théophile*. Gén. Civ. 13 (1888) 366; Par. Ing. Civ. Mm. (1888) (*Pt.* 2) 531-; Rv. Un. Mines 4 (1888) 1-; Hain. S. Mm. 2 (1890) xix-; Fed. I. Mn. E. T. 1 (1892) 79-.
- Guidi, *Filippo*. Rm. N. Linc. At. 53 (1900) 50-.

- Guillaume, *F. C.* Lum. Élect. 26 (1887) 595.
- Gusinde, *Oswald*. Elekttech. Z. 17 (1896) 792.
- Guthrie, *Francis*. J. Bt. 37 (1899) 528; Nt. 61 (1899-1900) 84.
- Guthrie, *Frederick*. Gl. S. QJ. 43 (1887) (*P.*) 48; L. Ps. S. P. 8 (1887) (*Ann. Meet.* 1887) 9-; Nt. 35 (1887) 8-; Term. Közl. 19 (1887) 505.
- Gylden, *Johann August Hugo*. C. R. 123 (1896) 771-; Lpldina. 32 (1896) 189; Obs. 19 (1896) 446; St. Pét. Ac. Sc. Bll. 5 (1896) lxvii-; Acta Mth. 20 (1897) 397-; As. Nr. 142 (1897) 49-; As. S. M. Not. 57 (1897) 222-; Bll. As. 14 (1897) 289-; Ciel et Terre 17 (1896-97) 568-; Helsingf. Acta 23 (1897) No. 9, 29 pp.; Leip. As. Gs. Vjschr. 32 (1897) 8-; Nt. 55 (1896-97) 38, 158-; Wiad. Mt. 1 (1897) 31-; Münch. Ak. Sb. 27 (1898) 409-.
- Hachette, *Jean Nicolas Pierre*. Fr. S. Ag. Mm. (1834) 143-.
- Hänsch, *Hermann*. Berl. Ps. Gs. Vh. (1896) 77-.
- Haidinger, *Wilhelm Karl von*. Ausl. 44 (1871) 449-; Bonn Cor.-Bl. NH. Vr. (1871) 15-; Rv. Cours Sc. 1 (1871) 410-; Wien Alm. (1871) 159-; Wien Jb. Gl. 21 (1871) 31-; R. S. P. 20 (1872) xxv-; Mag. Tud. Ak. Évk. 13 (1876) (*No.* 10) 15-.
- Hajeck, *Camillo*. Mil. I. Lomb. Rd. 17 (1884) 56-.
- Hake, *Rudolph*. Elekttech. Z. 18 (1897) 261.
- Hallaschka, *Franz Cassian*. Brünn Mt. 65 (1885) (*Beil.*) 33.
- Hallaue, *Octave René*. Mulhouse S. In. Bll. 54 (1884) 139-; Science 4 (1884) 306-.
- Halske, *Johann Georg*. Berl. Ps. Gs. Vh. (1890) 39-.
- Hamilton, (*Sir*) *William Rowan*. Am. J. Sc. 42 (1866) 293-; As. S. M. Not. 26 (1866) 109-; Ir. Ac. P. 9 (1867) 307-.
- Hampson, *Robert Stewart*. I. Elect. E. J. 28 (1899) 675-.
- Hankel, *Wilhelm Gottlieb*. Elekttech. Z. 20 (1899) 181; Leip. Mth. Ps. B. 51 (1899) lxvii-; Lpldina. 35 (1899) 58-; Ps. Rv. 9 (1899) 58; Münch. Ak. Sb. 30 (1901) 348-.
- Harris, (*Sir*) *William Snow*. R. S. P. 16 (1868) xviii-.
- Harting, *Pieter*. Lpldina. 21 (1885) 215; Amst. Ak. Jb. (1888) 1-.
- Hartnack, *Edmund*. Term. Közl. 24 (1892) 642; Ts. Ps. C. 31 (1892) 64.
- Hasler, *Gustav*. Sch. Nf. Gs. Vh. (1900) xlviii-.
- Haughton, (*Rev.*) *Samuel*. Gl. Mg. 4 (1897) 573-; I. ME. P. (1897) 514-; Mn. Mg. 11 (1897) 346-; Gl. S. QJ. 54 (1898) lxvi-; Ir. Ntlist. 7 (1898) 1-; Nt. 57 (1897-98) 65-; R. S. P. 62 (1898) xxix-.
- Hausmann, *Johannes*. Elekttech. Z. 21 (1900) 1004.
- Hawksley, *Thomas*. I. & S. I. J. (1893) (*No.* 2) 290; Nt. 48 (1893) 522; I. CE. P. 117 (1894) 364-; Met. S. QJ. 20 (1894) 111-; R. S. P. 55 (1894) xvi-.

- Hearder, *Jonathan Nash*. Devon. As. T. 9 (1877) 55-; Plym. I. T. 6 (Pt. 1) (1877) 150-.
- Heid, *Hermann*. Wien Pht. Cor. 28 (1891) 214-.
- Heller, *Ágost*. Mth. Nt. B. Ung. 18 (1903) 473-.
- Helmholtz, *Hermann Ludwig Ferdinand von*. A. d'Ocul. 112 (1894) 225-; Arch. f. Oph. 40 (1894) (Ab. 4) [v]-; Arch. Oph. 23 (1894) 514-; Arch. Ot. 23 (1894) 382; Berl. P. 27 (1894) 2643-; Bresl. Schl. Gs. Jbr. (1894) (*Allg. B.*) 32-; [Bucarest S. Sc. Bl. 3 (1894)] 260-; C. N. 70 (1894) 146; C. R. 119 (1894) 1044-; C. Ztg. 18 (1894) 1395; Cztg. Opt. 15 (1894) 205-; Dubl. J. Md. Sc. 98 (1894) 459-; Elect. Rv. 35 (1894) 319-; Elekttech. Z. 15 (1894) 613-; J. Tél. 18 (1894) 358; Lpldina. 30 (1894) 163; Mon. Sc. 8 (1894) 782, 801-; Nt. 50 (1894) 479-; Rv. Sc. 2 (1894) 379, 429-; 8 (1897) 321-, 360-; Rv. Sc.-Ind. 26 (1894) 160; Rv. Sper. Freniadr. 20 (1894) 671-; Smiths. Rp. (1894) 709-; (1895) 787-; St. Pét. Ac. Sc. Bll. 1 (1894) (*Prot.*) 51-; Wien Md. Wschr. 44 (1894) 1645-; 46 (1896) 1-, 44-, 98-; Z. Instk. 14 (1894) 341-; Z. Nw. 67 (1894) 321-; Am. Ac. P. 30 (1895) 592-; Ciel et Terre 15 (1894-95) 422; Crelle J. Mth. 114 (1895) 353; Frkf. a. M. Ps. V. Jbr. (1894-95) 24-; Fsch. Md. 13 (1895) 123-, 163-; I. CE. P. 119 (1895) 361-; Königsb. Schr. 35 (1895) 63-, [38]; L. Ps. S. P. 13 (1895) (*Ann. Meet.* 1895) 9-; Manch. Lt. Ph. S. Mm. & P. 9 (1895) 230-; Md.-Chir. T. 78 (1895) cvi; Phm. J. 25 (1895) 222; Ps. Rv. 2 (1895) 222-; Senckb. Nf. Gs. B. (1895) v-; Term. Kōzl. 27 (1895) 18-; Wien Alm. 45 (1895) 283-; Z. Ohrh. 26 (1895) 252-; Zür. Nf. Gs. Njbl. (1895) 36 pp.; Berl. Ak. Ab. (1896) 50 pp.; C. S. J. 69 (1896) 885-; Münch. Ak. Sb. 25 (1896) 185-; R. I. P. 14 (1896) 481-; R. S. P. 59 (1896) xvii-; Science 3 (1896) 189-; Würtb. Jh. 52 (1896) ci-; Gen. S. Ps. Mm. 32 (1894-97) (Pt. 1) lxxvi-; Heidl. Nt. Md. Vh. 5 (1897) 315-; N. Antol. Sc. 171 (1900) 710-; Practit. 64 (1900) 664-.
- Hemenway, *Frank F.* Am. Eng. & Railroad J. 72 (1898) 384.
- Henry, *Joseph*. Am. J. Sc. 15 (1878) 462-; Smiths. Rp. (1878) 143-; Wash. Ph. S. Bll. 2 (1875-80) 203-; Smiths. Misc. Col. 20 (1881) Art. 2, 203-; 21 (1881) Art. 3, 514 pp.; 30 (1887) x+523 and vi+559 pp.; Elect. 28 (1892) 327-, 348-, 407-, 661-; Elect. Rv. 46 (1900) 77-, 88-.
- Hermann, *Rudolph*. Mosc. S. Nt. Bll. 54 (1879, Pt. 2) (1880) 159-; St. Pet. Mn. Gs. Vh. 16 (1881) 1-.
- Herschel, (*Sir*) *John Frederick William*. Brux. Ac. Bll. 31 (1871) 478-; Smiths. Rp. (1871) 109-; Am. Ph. S. P. 12 (1872) 217-; As. S. M. Not. 32 (1872) 122-; Edinb. R. S. P. 7 (1872) 543-; R. S. P. 20 (1872) xvii-; Rv. Sc.-Ind. 3 (1872) 40-; Am. Ac. P. 8 (1873) 461-; Wien Alm. (1873) 147-; Mag. Tud. Ak. Étk. (*Mth.*) 3 (1875) (No. 3) 14 pp.; Wien Pht. Cor. 24 (1887) 7-.
- Hertz, *Heinrich Rudolph*. Frkf. a. M. Ps. V. Jbr. (1892-93) 56-; Z. Nw. 66 (1893) 370-; Berl. Ps. Gs. Vh. (1894) 9-; C. Ztg. 18 (1894) 21-; Elect. 32 (1894) 273; 33 (1894) 272-, 299, 332-, 415-; Elekttech. Z. 15 (1894) 28; Lpldina. 30 (1894) 54-; Lum. Elect. 51 (1894) 150, 241-; Manch. Lt. Ph. S. Mm. & P. 8 (1894) 214-; N. Cim. 35 (1894) 5-; Nt. 49 (1893-94) 265-; Ps. Rv. 1 (1894) 383-; Rv. Sc. 1 (1894) 123-; Rv. Sc.-Ind. 26 (1894) 32; Smiths. Rp. (1894) 719-; Term. Kōzl. 26 (1894) (*Suppl.*) 49-; Ts. Ps. C. 33 (1894) 129-; Wien Alm. 44 (1894) 263-; Erlang. Ps. Md. S. Sb. 26 (1895) 15-; Münch. Ak. Sb. 24 (1895) 146-; Karlsruhe Nt. V. Vh. 11 (1896) (*Ab.*) 355-; R. I. P. 14 (1896) 321-; Gen. S. Ps. Mm. 32 (1894-97) Pt. 1, lxix-; Danzig Schr. 9 (1895-98) (*Heft* 1) xxv-.
- Hess, *Johann Jakob*. Zür. Vjschr. 41 (1896) (*Festschr.*, Th. 1) 124-.
- Hessel, *Johann Friedrich Christian*. N. Jb. Mn. (1896) (Bd. 2) 107-.
- Hick, *John*. I. CE. P. 117 (1894) 379-; I. ME. P. (1894) 161-; I. & S. I. J. (1894) (No. 1) 391.
- Higginson, *Alfred*. Lpool. Lt. Ph. S. P. 39 (1885) xi-.
- Hilger, *Adam*. Asps. J. 6 (1897) 139-; Nt. 56 (1897) 34; As. S. M. Not. 58 (1898) 138.
- Hipp, *Matthäus*. Elekttech. Z. 14 (1893) 323-, 715; Neuch. S. Sc. Bll. 24 (1896) 212-.
- Hirn, *Gustav Adolph*. Böne Ac. Hip. Bll. 24 (1891) (C. R. 1890) iii-; Brux. Ac. Bll. 19 (1890) 175-; 20 (1890) 132-; C. R. 110 (1890) 115-; Lpldina. 26 (1890) 56; Manch. Lt. Ph. S. Mm. & P. 3 (1890) 159-; Nt. 41 (1890) 323-; Par. Ing. Civ. Mm. (1890) (Pt. 1) 109-; Rio Obs. Rv. (1890) 41-; Rv. Sc. 45 (1890) 193-; Rv. Sc.-Ind. 22 (1890) 60; A. Cons. Arts et Mét. 3 (1891) 276-; Term. Kōzl. 23 (1891) 633; Ts. Ps. C. 30 (1891) 63.
- Hirst, *Thomas Archer*. Lpldina. 28 (1892) 59; Nt. 45 (1892) 399-; As. S. M. Not. 53 (1893) 218-; L. Ps. S. P. 12 (1894) (*Ann. Meet.* 1893) 9; R. S. P. 52 (1893) xii-.
- Höpfner, *C.* Z. Nw. 73 (1900) 367-.
- Hoffmann, *Josef*. Wien Pht. Cor. 34 (1897) 320.
- Hofstede, *J. P.* Elekttech. Z. 14 (1893) 204.
- Hoh, *Theodor*. Berl. Ps. Gs. Vh. (1888) 61-; Bamb. Nf. Gs. B. 15 (1890) iii-.
- Holloway, *Josephus Flavius*. Am. Eng. & Railroad J. 70 (1896) 264; Am. I. Mn. E. T. 26 (1897) 827-.
- Homolatsch, *Josef*. Wien Pht. Cor. 25 (1888) 217-.
- Hopkinson, *John*. Elect. 41 (1898) 622-; Elect. Rv. 43 (1898) 338-; Elekttech. Z. 19 (1898) 617; I. ME. P. (1898) 534-; J. Tél. 22 (1898) 278-; L. Mth. S. P. 29 (1898) 727-; Nt. 58 (1898) 419-; I. CE. P. 135 (1899) 338-; I. Elect. E. J. 27 (1899) 647-; 28 (1899) 676-; L. Ps. S. P. 16 (1899) (*Ann. Meet.* 1899) 9; R. S. P. 64 (1899) xvii-.
- Hoppe, *Ernst Reinhold Eduard*. D. Ps. Gs. Vh. (1900) 183-; Lpldina. 36 (1900) 132.

- Horner, *Johann Caspar*. Zür. Vjschr. 41 (1896) (*Festschr.*, Th. 1) 79-.
- Horner, *Johann Jakob*. Zür. Vjschr. 41 (1896) (*Festschr.*, Th. 1.) 227-.
- Hornig, *Emil*. Wien Pht. Cor. 27 (1890) 57-.
- Howard, *James Lisey*. L. Ps. S. P. 17 (1901) (*Ann. Meet.* 1900) 13-; Ph. Mg. 49 (1900) 160.
- Hubbard, *Gardiner Greene*. Science 6 (1897) 974-; Gg. J. 11 (1898) 186.
- Huet, *Adrien*. s. Gravenh. I. Ing. Ts. (1898-99) (*Verg.*) 162-.
- Hughes, *David Edward*. Elect. 44 (1900) 457-; Elect. Rv. 46 (1900) 185-; Elekttech. Z. 21 (1900) 120; I. Elect. E. J. 29 (1900) 950-; J. Tél. 24 (1900) 63-; Lpldina. 36 (1900) 49; L. Ps. S. P. 17 (1901) (*Ann. Meet.* 1900) 12; Nt. 61 (1899-1900) 325-.
- Humboldt, *Pierre Césaire*. A. Tél. 12 (1885) 573-.
- Hunt, *J. Gibbons*. Am. Mer. S. P. 14 (1892) 166-.
- Hunt, *Robert*. Nt. 37 (1888) 14; Phot. J. 12 (1888) 77-; Yorks. Gl. S. P. 10 (1889) 243-; R. S. P. 47 (1890) i-.
- I'Anson, *James*. I. & S. I. J. (1898) (No. 1) 317; Nt. 57 (1897-98) 566.
- Iselin, *J. F.* L. Ps. S. P. 6 (1885) (*Ann. Meet.* 1885) 11-.
- Jablochhoff, *Paul*. Elect. 32 (1894) 663-; J. Tél. 18 (1894) 171; Lum. Elect. 52 (1894) 95-.
- Jackson, *George*. Mer. S. J. (1895) 16.
- Jacobi, *Moritz Hermann von*. St. Pét. Ac. Sc. Bll. 21 (1876) 261-; St. Pet. Ac. Sc. Mm. (Rus.) 28 (1876) 61-.
- Jamin, *Jules Célestin*. Aér. (1886) 43-; C. R. 102 (1886) 339-; Gén. Civ. 8 (1885-86) 255; Lpldina. 22 (1886) 58; Lum. Elect. 19 (1886) 375-; N. Cim. 19 (1886) 96; Nt. 33 (1886) 374, 493-; Rv. Sc.-Ind. 18 (1886) 94-; Tel. J. 18 (1886) 177; Ts. Ps. C. 27 (1888) 286.
- Jedlik, *Anyos István*. Nt. 53 (1895-96) 516-; Term. Közl. 28 (1896) 637-; 29 (1897) 387-; Mag. Tud. Ak. Ets. 8 (1897) 273-; Mth. Nt. B. Ung. 15 (1899) 401-.
- Jellett, (*Rev.*) *John Hewitt*. Nt. 37 (1888) 396-.
- Jenkin, *Henry Charles Fleeming*. A. Tél. 12 (1885) 286-; Elect. 15 (1885) 97; I. CE. P. 82 (1885) 365-; I. ME. P. (1885) 458-; J. Tél. 9 (1885) 137-; Lum. Elect. 16 (1885) 629; Nt. 32 (1885) 153-; Tel. E. J. 14 (1885) 345-; Tel. J. 16 (1885) 554-; R. S. P. 39 (1886) i-; Edinb. R. S. P. 14 (1888) 117 (*bis*)-.
- Johannes, *Bernhard*. Wien Pht. Cor. 36 (1899) 295-.
- Johnson, *Charles Roberts*. Am. Eng. & Railroad J. 67 (1893) 499-.
- Jolly, *Philipp Johann Gustav von*. Lpldina. 20 (1884) 224; Met. Z. 2 (1885) 276-; Münch. Ak. Sb. 15 (1886) 119-.
- Jones, *Thomas P.* Franklin I. J. 130 (1890) 1-.
- Jones, (*Capt.*) *William Richard*. Railroad & Eng. J. 63 (1889) 531-; I. & S. I. J. (1890) (No. 1) 179-.
- Jordan, *Samson*. Eng. S. T. (1900) 267-; I. & S. I. J. (1900) (No. 1) 253-; Nt. 61 (1899-1900) 544-; Par. Ing. Civ. Mm. (1900) (*Pt.* 1, A) 237-; Rv. Un. Mines 49 (1900) 285-.
- Jordan, *Thomas Brown*. Cornwall Pol. S. Rp. (1890) 18-.
- Joule, *James Prescott*. C. Ztg. 13 (1889) 1409; Educ. Times 42 (1889) 472; Elect. 23 (1889) 600-; Lpldina. 25 (1889) 216-; Lum. Elect. 34 (1889) 195-; Magdeb. Nt. Vr. Jbr. u. Ab. (1889) 75; Méx. Obs. Bl. 2 (1889) 408; Nt. 40 (1889) 613-; Tel. J. 25 (1889) 457-; Am. Ac. P. 25 (1890) 346-; C. S. J. 57 (1890) 449-; Glasg. I. Eng. T. 33 (1890) 210-; L. Ps. S. P. 10 (1890) (*Ann. Meet.* 1890) 10-; Term. Közl. 22 (1890) 81-; Tor. Ac. Sc. At. 25 (1890) 36-; Ts. Ps. C. 29 (1890) 29-.
- Jousselin, *Paul Louis*. Par. Ing. Civ. Mm. (1893) (*Pt.* 2) 416-; Gén. Civ. 24 (1893-94) 63.
- Jovanovits, *Anastas*. Wien Pht. Cor. 36 (1899) 730-.
- Kambly, *Ludwig*. Bresl. Schl. Gs. Jbr. (1887) 403-.
- Kargl, *Franz*. Wien Pht. Cor. 30 (1893) 553-.
- Karsten, *Gustav*. D. Ps. Gs. Vh. (1900) 147-; Lpldina. 36 (1900) 49-.
- Kastner, *Karl Wilhelm Gottlob*. Arch. Phm. 146 (1858) 321-; 151 (1860) 93-.
- Kaven, *August von*. Hann. Archt.-Vr. Z. 37 (1891) 445-.
- Kelland, *Philip*. R. S. P. 29 (1879) vii-; Edinb. R. S. P. 10 (1880) 321-.
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- , —, — (Fitzgerald). *Reynolds, O.* Ph. Mg. 7 (1879) 179-.
- , — tube, action on radiometer. *Fontana, A., & Umani, A.* Rm. R. Ac. Linc. Rd. 5 (1896) (Sem. 1) 170-.
- , —, circulation of residual gaseous matter. *Swinton, A. A. C.* [1898] L. Ps. S. P. 16 (1899) 148-, 156-; Ph. Mg. 46 (1898) 387-, 393-.
- , —, ponderomotive force. *Myškin, N. P.* Vars. S. Nt. Tr. (1899) (C. R., Ps. C.) No. 1, 2-.
- , force causing motion in body exposed to. *Schuster, A.* [1876] *Phil. Trans.* 166 (1877) 715-.
- , mechanical action. *Cooley, Le R. C.* [1876] *Alb. I. T.* 9 (1879) 1-.
- , —, historical note. *Bizio, G.* Ven. I. At. 2 (1876) 857-.
- and molecular attraction, relation between. *Waals, J. D. van der (jun.).* [1900] *Amst. Ak. Vs.* 9 (1901) 46-; *Amst. Ak. P.* 3 (1901) 27-.
- , repulsion accompanying. *Crookes, W.* [1873-78] (ix) *Phil. Trans.* 164 (1874) 501-; 165 (1875) 519-; 166 (1876) 325-; 169 (1878) 243-; 170 (1879) 87-.
- , —, experimental researches. *Crookes, W.* Nt. 19 (1879) 511-, 533-.
- , —, influence of residual gas. *Crookes, W.* [1876] R. S. P. 25 (1877) 136-.
- , —, Otheoscope. *Crookes, W.* [1877] R. S. P. 26 (1878) 176-; C. R. 84 (1877) 1081-, 1156-.

RADIOMETER.

- Crookes, W.* R. S. P. 23 (1875) 377-.
- Poggendorff, J. C.* A. Ps. C. 156 (1875) 488-.
- Tupper, J. L.* [1875] *Rugby NH. S. Rp.* (1876) 20-.
- Berthold, G. (of Ronsdorf).* A. Ps. C. 158 (1876) 483-.
- Finkener, R.* A. Ps. C. 158 (1876) 572-.
- Schuster, A.* A. Ps. C. 159 (1876) 651-.
- Bertin, A.* A. C. 8 (1876) 278-, 431-; 10 (1877) 396-.

- Delsaulx, J.* Les Mondes 40 (1876) 462, 510-, 724-; 42 (1877) 64-.
- Fonvielle, W. de.* C. R. 82 (1876) 1250-.
- Ducretet, E.* C. R. 83 (1876) 53-.
- Gaiffe, A.* C. R. 83 (1876) 272.
- Fonvielle, W. de.* C. R. 83 (1876) 385-.
- Crookes, W.* C. R. 83 (1876) 572-.
- Frankland, E.* Nt. 14 (1876) 556.
- Volpicelli, P.* [1876] Nt. 15 (1877) 101.
- Key, (Rev.) H. C.* Woolh. FC. T. (*1874-76) 176-.
- Lippmann, G.* Par. S. Ps. Sé. (1876) 175-.
- Newall, H. F.* [1876] *Rugby NH. S. Rp.* (1877) 16-.
- Rossetti, F.* N. Cim. 16 (1876) 157-, 206-.
- Salet, G.* As. Fr. C. R. (1876) 252-.
- Secchi, (il padre) A. (xii)* Rv. Sc.-Ind. 8 (1876) 193-.
- Stoney, G. J.* Ph. Mg. 1 (1876) 177-, 305-.
- Cooke, J. P.* Am. J. Sc. 14 (1877) 231-.
- Grove, (Sir) W. R.* Nt. 15 (1877) 435.
- Hankel, W. G.* Leip. Mth. Ps. B. 29 (1877) 67-.
- Marcon, P. (xii)* Rv. Sc.-Ind. 9 (1877) 78-.
- Mohr, C. F.* Z. Mth. Ps. 22 (1877) 45-.
- Puluj, J.* [1877] *Wien Ak. Sb.* 76 (1878) (Ab. 2) 226-.
- Riecke, C. V. E.* Gött. Nr. (1877) 500-.
- Fridrich, F.* Trieste Bll. 3 (1878) 198-.
- Stone, W. H.* Pop. Sc. Rv. 17 (1878) 164-.
- Puluj, J.* [1879] *Wien Ak. Sb.* 80 (1880) (Ab. 2) 132-.
- Seifert, J.* *Wien Pht. Cor.* 16 (1879) 60-.
- Grünberg, T.* *Riga Cor.-Bl.* 23 (1880) 166-.
- Pringsheim, E.* [1882] A. Ps. C. 18 (1883) 1-.
- Mayette, J.* [1889] *Lyon S. Ag. A.* 2 (1890) lxxviii-.
- Rosenbach, —.* *Bresl. Schl. Gs. Jbr.* (1893) (Ab. 2a) 27-, 41-.
- absorption-. *Thore, J. (xii)* *Dax S. Borda Bll.* 2 (1877) 295-; 7 (1882) 57-.
- (Thore). *Dufourcet, E. (xii)* *Dax S. Borda Bll.* 6 (1881) 205-.
- cause of motion. [*Marco, F. non*] *Felice, M.* [1876] *Rm. R. Ac. Linc. T.* 1 (1877) 16-.
- , —. *Govi, G.* C. R. 82 (1876) 1410-; 83 (1876) 49-.
- , —. *Salet, G.* C. R. 83 (1876) 274-.
- , —. *Bertin, A., & Garbe, P.* C. R. 84 (1877) 30-; A. C. 11 (1877) 45-.
- , — (Bertin and Garbe). *Ledieu, A. C. H.* C. R. 88 (1879) 1298-.
- , —. *Troy, D. S.* *Science* 16 (1890) 234-.
- and its cosmic revelations. *Williams, W. M.* J. Sc. 6 (1876) 517-.
- Crookes's balance, experiments. *Salet, G.* C. R. 82 (1876) 1500-.
- and Crookes's experiments. *Abt, A. (xii)* *Orv.-Term. Éts.* 5 (1880) (*Term. Szak.*) 55-.
- effect of heat. *Hajech, C.* *Mil. I. Lomb. Rd.* 10 (1877) 767-.
- residual gas. *Crookes, W.* B. A. Rp. (1876) (*Sect.*) 30-.
- rotating electrostatic field. *Arnø, R.* Nt. 50 (1894) 155.
- sound waves. *Jeannel, J.* C. R. 83 (1876) 445-.

- effect of sparks. *Abt, A.* (xii) *Orv. Term.* Éts. 6 (1881) (*Term. Szak*) 221-.
- electrical theory. *Ferrini, R.* *Mil. I. Lomb. Rd.* 9 (1876) 794-.
- *Heen, P. de.* *Brux. Ac. Bll.* 32 (1896) 75-.
- electricity the cause of inverse motion. *Delsaulx, J.* *Nt.* 14 (1876) 449-.
- — — motion. *Delsaulx, J.* *Nt.* 14 (1876) 288-.
- experiments. *Böttger, R. C.* *Berl. B.* 9 (1876) 798-.
- *Crookes, W.* [1876] *R. S. P.* 25 (1877) 304-.
- *Krüß, A. H.* *A. Ps. C.* 159 (1876) 332-.
- *Ledieu, A. C. H.* *C. R.* 82 (1876) 1372-, 1476-.
- *Fonvielle, W. de.* *C. R.* 83 (1876) 970-.
- *Right, A.* *N. Cim.* 16 (1876) 228-.
- *Rossetti, F.* *Ven. I. At.* 2 (1875-76) 869-.
- *Stroumbo, S.* *Les Mondes* 41 (1876) 208-.
- *Weinhold, A. F.* *Carl Rpm.* 12 (1876) 107-, 220-.
- *Crookes, W.* *Nt.* 15 (1877) 224-, 299-.
- *Neesen, F. A.* *Ps. C.* 160 (1877) 143-.
- *Giordano, G.* *Nap. Rd.* 17 (1878) 17-.
- *Luca, S. de.* *Nap. Rd.* 17 (1878) 18-.
- *Schoultz, E. von.* *Göteb. Hndl.* 16 (1878) 10 pp.
- *Ferrini, R.* *Mil. I. Lomb. Rd.* 14 (1881) 101-.
- *Lancetta, P.* *Rv. Sc.-Ind.* 20 (1888) 240-.
- *Bennett, A. R.* [1890] *I. Elect. E. J.* 19 (1891) 607-.
- *Tuchschnid, A.* *Aarau Mt.* 7 (1895) 62-.
- explanation. *Ziegler, O.* (xii) *Ausl.* 50 (1877) 515-.
- by theory of emission. *Fonvielle, W. de.* *C. R.* 83 (1876) 52-, 148-.
- forms. *Alvergniat, (Frères).* *C. R.* 83 (1876) 273-, 323.
- *Zöllner, J. C. F.* *A. Ps. C.* 160 (1877) 459-.
- (explanation of Zöllner's). *Puluj, J.* *Wien Ak. Sb.* 81 (1880) (*Ab.* 2) 1092-; 82 (1881) (*Ab.* 2) 263-.
- *Baur, C.* *A. Ps. C.* 19 (1883) 12-.
- *Evans, G. W.* *Science* 2 (*1883) 215.
- *Seguy, G.* *C. R.* 120 (1895) 725.
- gaseous movements in. *Salet, G.* *C. R.* 83 (1876) 968-.
- heat and not light the motive power. *Cunnington, H. A.* *Pop. Sc. Rv.* 15 (1876) 128-.
- magnetic phenomena observed. *Basso, G.* *Tor. Ac. Sc. At.* 12 (1876) 502-.
- and mechanical action of light. *Carbonnelle, (le rév. père) I., & Ghysens, É.* [1876] (xii) *Brux. S. Sc. A.* 1 (1877) (*Pt.* 2) 59-.
- — — *Ledieu, A. C. H.* *C. R.* 82 (1876) 1241-, 1293-.
- — — *Montani, P.* *Rm. R. Ac. Linc. At.* 3 (1876) (*Pt.* 2) 597-.
- movement of glass case. *Crookes, W.* *R. S. P.* 24 (1876) 409-.
- movements. *Stokes, G. G.* [1877] *R. S. P.* 26 (1878) 546-.
- nature of force involved. *Rood, O. N.* *Am. J. Sc.* 12 (1876) 405-.
- observations. *Wartmann, É. F.* *Arch. Sc. Ps. Nt.* 55 (1876) 313-.
- *Canestrini, E.* *Padova S. Sc. At.* 9 (1885) 185-.
- polarisation stress. *Stoney, G. J.* *B. A. Rp.* (1879) 256.
- pressure in. *Donle, W.* *A. Ps. C.* 68 (1899) 306-.
- *Riecke, E.* *Gött. Nr.* (1899) 166-.
- pyro-electricity the cause of action. *Fonvielle, W. de.* *C. R.* 84 (1877) 122-.
- and telephone and otheoscope, theory. *Challis, J.* *Ph. Mg.* 5 (1878) 452-.
- theories. *Lippmann, G. J.* *de Ps.* 5 (1876) 220-, 366-; *Rv. Sc.* 11 (1876) 392-.
- theory. *Challis, J.* [1875] *Ph. Mg.* 1 (1876) 395-.
- *Clausius, R.* *Bonn Niedr. Gs. Sb.* (1875) 309-.
- *Crookes, W.* *J. Sc.* 5 (1875) 337-; 6 (1876) 228-.
- *Challis, J.* *Ph. Mg.* 2 (1876) 374-.
- *Crookes, W.* *C. R.* 83 (1876) 1175-, 1232-, 1289-; 84 (1877) 388-.
- *Challis, J.* *Ph. Mg.* 3 (1877) 278-, 395-.
- *Mees, R. A.* *Amst. Ak. Vs. M.* 13 (1878) 265-; *Arch. Néerl.* 14 (1879) 97-.
- use as photometer. *Pedler, A.* *Beng. As. S. P.* (1876) 187-.
- (athermanous), use as photometer. *Coulon, R.* *Lum. Élect.* 4 (*1881) 344-.

Radiometry, phenomena in liquids. *Bergner, A.* [1877] *A. Ps. C.* 3 (1878) 317-.

Repulsion, dust. *Fitzgerald, G. F.* *Dubl. S. Sc. P.* 4 (1885) 338.

—, gaseous. *Herapath, J.* *Tilloch Ph. Mg.* 60 (1822) 18-; 62 (1823) 61-, 136-.

— of heated bodies. *Fresnel, A. J.* *A. C.* 29 (1825) 57-, 107-.

— — — *Powell, B.* *Thomson Re.* 1 (1835) 250-.

— — — *Fusini, A.* *A. Sc. Lomb. Ven.* 7 (1837) 38-.

— between heated surfaces. *Powell, B.* *B. A. Rp.* (1834) 549-; *Ph. Mg.* 12 (1838) 317-.

— — — and certain pulverulent bodies. *Addams, R.* (*vi Add.*) *Ph. Mg.* 6 (1835) 415-.

Repulsive power of heat. *Powell, B.* *Phil. Trans.* (1834) 485-.

— — — sun's rays. *Kérickuff, H. de.* *C. R.* 53 (1861) 1256-.

— — — —, maximum. *Hirn, G. A.* *C. R.* 82 (1876) 1472-.

— — — — (Hirn). *Ledieu, A. C. H.* *C. R.* 83 (1876) 119-, 384-.

— — — — (Ledieu). *Hirn, G. A.* *C. R.* 83 (1876) 264-.

Resistance in gases. *Kleiber, I. A.* *Rs. Ps.-C. S. J.* 18 (*Ps.*) (1886) 52-; *Fsch. Ps.* (1886) (*Ab.* 2) 252.

Rotation, molecular, of gases. *Hinrichs, G.* *C. R.* 76 (1873) 1357-.

Solids, application of principles of mechanical theory of gases. *Mousson, A.* *Arch. Sc. Ps. Nt.* 2 (1879) 505-.

- Solids and gases or vapours, molecular action between. *Rave*, A. (xii) Barcel. Ac. Mm. 1 (1878) 331-.
- Space, relative occupation of, by gases. *Schmidt*, G. A. Ps. C. 6 (1879) 612-.
- Spectra, line-, of elements. *Julius*, V. A. Amst. Ak. Vh. 26 (1888) 125 pp.; Delft Ec. Pol. A. 5 (1889) 1-.
- Spectrum analysis, application to molecular mechanics. *Janssen*, J. B. A. Rp. (1888) 547-.
- Steam funnel of locomotives. *Gregorio*, A. de. Palermo Ac. At. 3 (1895) (Sc. Nt.) 103-.
- Stresses in rarefied gases arising from inequalities of temperature. *Maxwell*, J. C. [1878] Phil. Trans. 170 (1880) 231-.
- Sunbeams and atoms. *Ball*, (Sir) R. Smiths. Rp. (1893) 121-.
- Surface tension, density and heating, molecular theory. *Fuchs*, K. Exner Rpm. 24 (1888) 298-.
- Theory of gases. *Prevost*, P. Bb. Un. 9 (1818) 192-.
- — — *La Place*, P. S. (marquis) de. A. C. 18 (1821) 273-; Con. des Temps (1825) 219-, 302-, 386-.
- — — *Krönig*, A. Pogg. A. 99 (1856) 315-.
- — — *Stefan*, J. Wien SB. 47 (Ab. 2) (1863) 81-.
- — — *Moutier*, J. C. R. 66 (1868) 344-.
- — — *Wittwer*, W. C. Z. Mth. Ps. 14 (1869) 81-; 17 (1872) 13-.
- — — *Puschl*, K. [1874] Wien Ak. Sb. 70 (1875) (Ab. 2) 413-.
- — — (perfect gases). *Walter*, A. D. Nf. B. (*1877) 105-.
- — — *Bouty*, E. Rv. Sc. 18 (1880) 967-.
- — — dynamical problems illustrating. *Rayleigh*, (Lord). Ph. Mg. 32 (1891) 424-.
- — — Liouville's law and the corresponding law in. *Wind*, C. H. Wien Ak. Sb. 106 (1897) (Ab. 2a) 21-.
- — — statistical dynamics illustrated by meteor swarms and optical rays. *Larmor*, J. B. A. Rp. (1900) 632-.
- — — liquids. *Kononov*, D. Rs. Ps.-C. S. J. 18 (C.) (1886) 395-; Z. Ps. C. 1 (1887) 39-; 2 (1888) 1-.
- — — *Stankevič*, B. V. [1889] Vars. S. Nt. Tr. (1889-90) (C. R., Ps. C.) No. 4, 3-, No. 5, 1-, No. 6, 11-.
- — — (incompletely miscible). *Fuchs*, K. Exner Rpm. 26 (1890) 664-.
- — — *Jäger*, G. Wien Ak. Sb. 101 (1892) (Ab. 2a) 920-.
- — — with simple molecules. *Bakker*, G. J. de Ps. 6 (1897) 577-; 7 (1898) 511-.
- Thermal condition of gases. *Puschl*, K. Wien SB. 45 (Ab. 2) (1862) 357-.
- — — transpiration and radiometer motion. *Sutherland*, W. Ph. Mg. 42 (1896) 373-, 476-.
- — — *Reynolds*, O. Ph. Mg. 43 (1897) 142-.
- — — *Sutherland*, W. Ph. Mg. 44 (1897) 52-.
- Thermodynamic potential, kinetic interpretation. *Waals*, J. D. van der. Amst. Ak. Vs. 3 (1895) 205-; Arch. Néerl. 30 (1897) 137-.
- Thermodynamic surface of water. *Goldhammer*, D. A. Mosc. Un. Mm. (Ps.-Mth.) 6 (1885) 1-.
- Thermodynamics, second law, demonstration from mechanical principles. *Michelson*, V. A. Rec. Mth. (Moscou) 13 (1886) 229-.
- — — and kinetic theory of gases. *Burbury*, S. H. Ph. Mg. 1 (1876) 61-.
- Transformation of state of bodies, new theory. *Moulin*, H. Par. S. Ps. Sé. (1896) 45-, 268-.
- Transition layer between liquid and vapour. *Waals*, J. D. van der. [1888] Amst. Ak. Vs. M. 5 (1889) 171-; Fsch. Ps. (1888) (Ab. 2) 331-.
- Vacuum, nature of so-called. *Preston*, S. T. Ph. Mg. 4 (1877) 110-.
- — — *Stoney*, G. J. Ph. Mg. 4 (1877) 222-.
- Velocities of gases. *Mott*, A. J. [1881] Lpool. Lt. Ph. S. P. 36 (1882) 81-.
- Velocity of gases, limiting. *Pirogov*, N. N. Rs. Ps.-C. S. J. 13 (Ps.) (1886) 93-, 295-; Fsch. Ps. (1886) (Ab. 2) 238-.
- — — (Pirogov). *Stankevič*, B. V. Rs. Ps.-C. S. J. 19 (Ps.) (1887) 32-.
- — — (Stankevič). *Pirogov*, N. N. Rs. Ps.-C. S. J. 19 (Ps.) (1887) 133-.
- — — molecular. *Brusotti*, F. Mil. I. Lomb. Rd. 5 (1872) 754-.
- — — *Violi*, A. Rm. R. Ac. Linc. T. 8 (1884) 22-, 62-.
- — — and velocity of sound. *Brusotti*, F. Mil. I. Lomb. Rd. 10 (1877) 209-.
- — — liquids, molecular. *Guglielmo*, G. Rm. R. Ac. Linc. Rd. 6 (1897) (Sem. 2) 254-.
- — — mean, of molecules of imperfect gases. *Blaserna*, P. C. R. 69 (1869) 134-.
- — — molecular. *Wächter*, F. Lieb. A. 191 (1878) 309-; 192 (1878) 256.
- — — *Jäger*, G. Wien Ak. Sb. 99 (1891) (Ab. 2a) 860-.
- — — and temperature. *Juppont*, —. Toul. Ac. Sc. Bll. 1 (1898) 117-.
- — — of reacting gas molecules. *Cantor*, M. A. Ps. C. 62 (1897) 482-.
- — — total molecular, of body, results of calculation. *Sandrucci*, A. Rv. Sc.-Ind. 18 (1886) 217-, 267-.

VIRIAL.

- Clausius*, R. Bonn Sb. Niedr. Gs. (1870) 114-; C. R. 70 (1870) 1314-.
- Cerruti*, V. Nap. Rd. 15 (*1876) 154-; As. Fr. C. R. 5 (1876) 122-.
- Pirogov*, N. N. Rs. Ps.-C. S. J. 20 (Ps.) (1888) 1-; 21 (Ps.) (1889) 219-; 23 (Ps.) (1891) 127-; Fsch. Ps. (1889) (Ab. 2) 207-; (1891) (Ab. 2) 248-; Z. Mth. Ps. 37 (1892) 257-.
- application to kinetic theory of gases. *Lorentz*, H. A. A. Ps. C. 12 (1881) 127-, 660-.
- — — *Eddy*, H. T. Franklin I. J. 85 (1883) 339-, 409-.
- — — *Sonin*, N. J. [1889] Vars. S. Nt. Tr. (1889-90) (C. R., Ps. C.) No. 7, 1-; Fsch. Ps. (1890) (Ab. 2) 247-.
- case. *Clausius*, R. C. R. 78 (1874) 1731-.

0250 Occlusion of Gases

- Occlusion of gases by metals. *Odling, W.* [1867] R. I. P. 5 (1869) 159-.
- — — — — *Bose, E.* Z. Ps. C. 34 (1900) 701-.
- — — — — platinum black. *Mond, L., Ramsay, W., & Shields, J.* Phil. Trans. (A) 190 (1898) 129-.
- — — — — hydrogen by iron. *Bellati, M., & Lussana, S.* Ven. I. At. (1888-89) 1321-.
- — — — — metals. *Graham, T.* R. S. P. 16 (1868) 422-; C. R. 66 (1868) 1014-.
- — — — — meteoric iron. *Graham, T.* R. S. P. 15 (1867) 502-; C. R. 64 (1867) 1067-.
- — — — — nickel, resistance of nickel. *Bellati, M., & Lussana, S.* Ven. I. At. (1887-88) 1567-.
- — — — — and oxygen by palladium. *Mond, L., Ramsay, W., & Shields, J.* Phil. Trans. (A) 191 (1898) 105-.
- — — — — platinum black. *Mond, L., Ramsay, W., & Shields, J.* Phil. Trans. (A) 186 (1896) 657-.
- — — — — phenomena. *Schutzenberger, P.* C. R. 98 (1884) 1520-.

0300 Capillarity. (See also Chemistry 7165.)

(For Spheroidal State see 1840.)

- Leslie, John.* Tilloch Ph. Mg. 14 (1802) 193-.
- Milon, —.* J. de Ps. 54 (1802) 128-.
- Örsted, H. C.* Kiøb. Ov. (1819-20) 12-.
- Poisson, S. D.* Magendie J. de Pl. 6 (1826) 361-.
- Emmett, J. B.* Ph. Mg. 1 (1827) 115-, 332-.
- Magnus, G.* Pogg. A. 10 (1827) 153-.
- Strong, T.* Silliman J. 18 (1830) 70-.
- Clausen, T.* Gruithuisen N. Annalek. 1 (1834) (Heft 2) 5-.
- Cooper, P.* Thomson Re. 4 (1836) 344-.
- Örsted, H. C.* Kiøb. Ov. (1840) 22-; Erdm. J. Pr. C. 23 (1841) 472-.
- Simon, —.* C. R. 12 (1841) 892-; A. C. 32 (1851) 5-.
- Örsted, H. C.* A. C. 4 (1842) 379-.
- Mossotti, O. F.* (vi Adds.) Il Cim. 4 (1846) 439-.
- Henry, J.* Am. Ph. S. P. 4 (1847) 176-.
- Desains, E.* [1852-56] C. R. 34 (1852) 765-; A. C. 51 (1857) 385-.
- Wertheim, G.* [1854] A. C. 63 (1861) 129-.
- Desains, E.* C. R. 43 (1856) 1077-.
- Zantedeschi, F.* Ven. At. (1855-56) 811-.
- Wertheim, G.* C. R. 44 (1857) 1022-.
- Osann, G.* [1858] Würzb. Vh. 9 (1859) 44-.
- Bède, É.* Brux. Mm. Cour. 4^o, 30 (1861) 198 pp.
- Bashforth, F. B. A.* Rp. (1862) (pt. 2) 2-.
- Bède, É.* [1862] (vii) Brux. Mm. Cour. 4^o, 32 (1865) 17 pp.; 33 (1867) 37 + 28 pp.
- Potter, R.* Camb. Ph. S. P. 1 (1866) 21-.
- Roger, É.* C. R. 62 (1866) 134-, 848-; 74 (1872) 1510-; 76 (1873) 816-.
- Tait, P. G.* Edinb. R. S. P. 5 (1866) 593-.

Capillarity 0300

- Mensbrugghe, G. van der.* Les Mondes 21 (1869) 302-.
- Duclaux, E.* J. de Ps. 1 (1872) 350-.
- Scholz, R.* A. Ps. C. 148 (1873) 62-.
- Tait, P. G.* [1873-75] (xi) Edinb. R. S. P. 8 (1875) 208-, 485.
- Spring, W.* Brux. Ac. Bl. 41 (1876) 914-.
- Coutance, A. G. A.* (xii) Brest S. Ac. Bl. 6 (1880) 81-.
- Eötvös, (báró) L.* (xii) Mag. Tud. Ak. Ets. 16 (No. 2) (1882) 48.
- Riley, J. T.* Ph. Mg. 15 (1883) 191-.
- Worthington, A. M.* [1885] Birm. Ph. S. P. 5 (1885-87) 83-.
- Thomson, (Sir) W.* [1886] R. I. P. 11 (1887) 483-.
- Nasse, O.* Meckl. Vr. Nt. Arch. (1889) xvi-.
- Gossart, É.* C. R. 113 (1891) 537-.
- Briggs, J. E.* [1896] Jam. I. J. 2 (1899) 212-.
- Mensbrugghe, G. van der.* [1900] Sc. Abs. 4 (1901) 355.
- Absorption of gases, capillary. *Bunsen, R. W.* A. Ps. C. 24 (1885) 321-; 25 (1885) 680.
- Action of liquid on solid at short distance. *Cintolesi, F.* (xii) Rv. Sc.-Ind. 7 (1875) 219-.
- Adhesion. *Schwabe, H.* Anhalt Vh. Nt. Vr. 8 (1849) 10.
- , apparent. *Stefan, J.* Wien Ak. Sb. 69 (1874) (Ab. 2) 713-.
- experiments. *Ruhland, R. L.* Schweigger J. 11 (1814) 146-.
- —, use of lamp-black in. *Geubel, H. K.* (xii) Arch. Phm. 121 (1852) 111-.
- , liquid. *Link, H. F.* Gilbert A. 24 (1806) 121-; 26 (1807) 146-.
- —, *Tomlinson, C.* Ph. Mg. 33 (1867) 401-.
- between liquid and damp paper. *Dapples, C.* Laus. S. Vd. Bl. 15 (1878) (PV.) 91-.
- of liquids to mercury. *Gore, G.* Ph. Mg. 26 (1863) 142-.
- — — — — solids. *Bugge, T.* Dn. Vd. Selsk. Skr. 2 (1801-02) (heft 2) 57-.
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- , pressure. *Bakker, G. Z. Ps. C.* 12 (1893) 280-.
- Motion of liquids in capillary spaces. *Ductaux, É. A. C.* 25 (1872) 433-; *C. R.* 74 (1872) 368-.
- , —, peculiar. *Cauchy, A. L. Par. Éc. Pol. J.* (19^e cah.) (1823) 204-.

MOTION OF SOLIDS AND LIQUIDS
ON LIQUIDS.

- Lehot, C. J. Bb. Brit.* 59 (1815) 377-.
- Carradori, G. Brugnattelli G.* 9 (1816) 124-; 10 (1817) 274-.
- Gilliéron, L. Bb. Un.* 26 (1824) 190-.
- Moutier, J. Par. S. Phlm. Bil.* 4 (1880) 245-.
- Le Conte, J. Am. J. Sc.* 27 (1884) 307-.
- Benzoic acid on water. *Tomlinson, C. C. N.* 10 (1864) 25.
- Camphor. *Lévat, —. As. Fr. C. R.* (1891) (Pt. 2) 331-.
- , and other bodies. *Schweigger-Seidel, F. W. Schweigger J. 44 (=Jb. 14)* (1825) 285-.
- , —, —. *Fechner, G. T. Kastner Arch. Ntl.* 9 (1826) 408-.
- , —, —, on water. *Prevost, B. A. C.* 21 (1797) 254-; 22 (1797) 111-; 24 (1797) 31-.
- , —, —, — (Prevost). *Carradori, G. A. C.* 37 (1800) 38-.
- , —, —, —. *Biot, J. B. Par. S. Phlm. Bil.* 3 (1801) 42-.
- , —, —, —, and mercury. *Boisgiraud, —, & Joly, —. C. R.* 12 (1841) 690-.
- , —, —, —. *Fusiniéri, A. (vi Add.)*
- Majocchi A. Fis. C.* 3 (1841) 157-.
- , —, liquids on water. *Tomlinson, C. Ph. Mg.* 46 (1873) 376-.

Camphor on Water.

- Venturi, G.* [1797] *Par. Mm. Sav. Étr.* 1 (1806) 125-.
- Carradori, G. Brugnattelli G.* 1 (1808) 97-.
- Barlocchi, S. G. Arcad.* 2 (1819) 226-.
- B., F. (vi Add.) Thomson A. Ph.* 8 (1824) 75-.
- Matteucci, C. A. Sc. Lomb. Ven.* 3 (1833) 194-.
- Dutrochet, H. C. R.* 12 (1841) 2-, 29-, 126-, 598-.

- (Dutrochet.) *Biot, J. B. C. R.* 12 (1841) 621-, 667-.
- Fusiniere, A. A. Sc. Lomb. Ven.* 11 (1841) 6-.
- Nöschel, A. (viii)* *Riga Cor.-Bl.* 3 (1849) 20-, 33-.
- Tomlinson, C. C. N.* 8 (1863) 28, 37-, 123-; *Intell. Obs.* 4 (1864) 17-; *Ph. Mg.* 38 (1869) 409-; *C. N.* 36 (1877) 215-.
- Skey, W.* [1878-80] *N. Z. I. T.* 11 (1879) 473-; 12 (1880) 403-.
- Casamajor, P. Am. C. S. J.* 7 (1885) 13-.
- Hart, T. C. N.* 51 (1885) 277-.
- Tomlinson, C. C. N.* 52 (1885) 50.
- Rayleigh, (Lord). R. S. P.* 47 (1890) 364-.
- action of oils. *Tomlinson, C. Ph. Mg.* 26 (1863) 187-; *R. S. P.* 48 (1891) 258.
- motion connected with electricity. *Virey, J. J. J. Phm.* 5 (1819) 237-.
- — — *Casamajor, P. C. N.* 36 (1877) 191-, 285-.
- Creosote on water. *Tomlinson, C. Ph. Mg.* 22 (1861) 111-.
- Eugenic acid on water. *Tomlinson, C. Ph. Mg.* 27 (1864) 528-.
- Floating bodies, apparent attractions and repulsions. *Le Conte, (Prof.) J. Am. J. Sc.* 24 (1882) 416-.
- — — — —, elementary theory. *Mensbrugghe, G. van der. Brux. Ac. Bil.* 5 (1883) 482-.
- — — — — when vapours of volatile liquids are allowed to fall on liquid surfaces. *Dutrochet, H. C. R.* 14 (1842) 1028-; 15 (1842) 25-.
- — —, attractive power on water. *Carradori, G. Tilloch Ph. Mg.* 11 (1801) 27-.
- — —, horizontal motion under capillary forces. *Worthington, A. M. Ph. Mg.* 15 (1883) 198-.
- — —, small, experiment of Mariotte's. *Bouty, E. J. de Ps.* 2 (1873) 263-.
- — —, needles, attraction. *Camilli, S. G. Arcad.* 37 (1828) 159-.
- Liquids on water. *Tomlinson, C.* [1869] *Ph. Mg.* 39 (1870) 32-.
- Organic acids, crystals. *Schefczik, A. Wien Jb. Gl.* 6 (1855) 263-.
- Phosphorus on mercury. *Carradori, G. Brugnatielli G.* 3 (1810) 261-.
- Powders on water. *Marangoni, C. Rm. R. Ac. Linc. Rd.* 4 (1888) (*Sem.* 1) 520-.
- Salts on water, gyratory movements. *Leacœur, H. Par. S. C. Bil.* 24 (1875) 270-.
- Solids, gyratory movements. *Weber, R. Arch. Sc. Ps. Nt.* 12 (1884) 510-.
- Substance which moves on water like camphor. *Morren, C. F. A. Quetelet Cor. Mth.* 10 (1838) 339-.
- Wicks, small lighted, on oil. *Wilson, P.* [1795] *Edinb. R. S. T.* 4 (1798) 163-.
- Motions, rotatory, in mixture of alcohol and laurel oil. *Hancock, T. Edinb. J. Sc.* 3 (1830) 51-.
- — —, mixtures of water and volatile liquids. *Harting, P. Amst. Vs. Ak.* 3 (1855) 445-; *Pogg. A.* 97 (1856) 50-.
- Motions, spontaneous, of certain bodies in proximity or contact. *Prevost, B. A. C.* 40 (1801) 1-.
- — — — — (Prevost). *Carradori, G. A. C.* 48 (1803) 197-.
- on surface of alcoholic liquors, certain curious. *Thomson, Jas. B. A. Rp.* (1855) (*pt.* 2) 16-.
- Oil to calm seas, successful use. *Marshall, W. P. Midl. Ntlist.* 11 (1888) 170-, 207-.
- , calming water and making surface transparent by. *Beek, A. van. A. C.* 4 (1842) 257-.
- drops on water. *Challis, J. Ph. Mg.* 8 (1836) 288-.
- films, thin, on water, properties. *Oberbeck, A. A. Ps. C.* 49 (1893) 366-.
- on water, molecular forces illustrated by. *Oberbeck, —. N.-Vorp. Mt.* 24 (1892) xxiv-.
- — waves, and wave motion. *Rosenbach, —. Bresl. Schl. Gs. Jbr.* (1894) (*Ab.* 2a) 59-.
- Oily surface layer of rivers, action. *Forel, F. A. Laus. S. Vd. Bil.* 34 (1898) xviii-.
- Pores of membranes, size. *Guerout, A. C. R.* 75 (1872) 1809-.
- — specified diameter, method of obtaining. *Barus, C. Ps. Rv.* 6 (1898) 52-.
- Porous mass, experiments on absorption. *Magrini, L. Mil. I. Lomb. Rd.* 1 (1864) 221-.
- substances, absorption of liquids by, laws. *Tate, T. Ph. Mg.* 20 (1860) 364-, 500-; 21 (1861) 57-, 115-.
- —, permeation of liquids into. *Cantoni, G. N. Cim.* 19 (*1863) 269-.
- Pulverisation of liquids. *Sencier, G. Rv. Sc.* 13 (1877) 379-.
- Rain, formation. *Mache, H. Wien Ak. Sb.* 109 (1900) (*Ab.* 2a) 793-.
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- Resistance to introduction of liquid into narrow vessel. *Duprez, F. J. (rx)* *Brux. Ac. Bil.* 16 (1863) 11-.
- Ripples, interference. *Matthiessen, L. A. Ps. C.* 32 (1887) 626-.
- , photography. *Vincent, J. H. L. Ps. S. P.* 15 (1897) 91-; *Ph. Mg.* 43 (1897) 411-; [45 (1898) 197 *Erratum*]; 45 (1898) 191-; 46 (1898) 290-; 48 (1899) 338-.
- and their relation to current velocity. *Hirst, T. A. Ph. Mg.* 21 (1861) 1-, 188-.
- in viscous liquid. *Tait, —. Edinb. R. S.* P. 17 (1891) 110-.
- and waves. *Thomson, (Sir) W. Nt.* 5 (1872) 1-.
- — —. *Langton, J. Nt.* 5 (1872) 241-.
- Sea froth. *Gladstone, J. H.* [1881] *Nt.* 25 (1882) 33.
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- Solid layers, thin, properties. *Quincke, G.* [1888] *A. Ps. C.* 35 (1888) 561-; *Heidl. Nt. Md. Vh.* 4 (1892) 258-.
- particles in liquids, forces between. *Bliss, W. J. A. Ps. Rv.* 2 (1895) 241-, 373-.
- Solutions, thermokinetic properties. *Natanson, W.* [1898-99] *Krk. Ak. (Mt.-Prz.) Rz.* 15 (1899) 377-; *Crc. Ac. Sc. Bll.* (1898) 295-; (1899) 349-.
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- Splash of a drop and allied phenomena. *Worthington, A. M.* [1894] *R. I. P.* 14 (1896) 289-.
- Splashes, apparatus for observing. *Worthington, A. M.* [1882] (xii) *Bristol Nt. S. P.* 4 (1885) 11-.
- Spreading of drops. *Eccher, A. de. (ix) N. Cim.* 5 & 6 (1871) 93-.
- —, experiments. *Cintolesi, F. Mil. I. Lomb. Rd.* 9 (1876) 187-; 10 (1877) 30-.
- —, experiments. *Cintolesi, F. (xii) Rv. Sc.-Ind.* 9 (1877) 285-, 309-, 341-.
- — on smooth surfaces. *Cintolesi, F. (xii) Rv. Sc.-Ind.* 9 (1877) 261-.
- — surface of another liquid. *Pisati, G. Mil. I. Lomb. Rd.* 1 (1868) 893-.
- — — — —. *Marangoni, C. (x) N. Cim.* 3 (1870) 105-.
- — liquids. *Du Bois-Reymond, P.* [1869] *A. Ps. C.* 139 (1870) 262-.
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- —, periodic. *Quincke, G. Berl. Ak. Sb.* (1888) 791-; *A. Ps. C.* 35 (1888) 580-.
- —, and influence on protoplasm motion. *Quincke, G.* [1888] *Heidl. Nt. Md. Vh.* 4 (1892) 269-.
- — solutions of aniline colours on water. *Obermayer, A. von. A. Ps. C.* 151 (1874) 130-.
- Superposed liquids in capillary tube, problem. *Mensbrugghe, G. van der.* [1875] *Brux. Mm. Cour.* 4^e, 41 (1878) (No. 1) 44 pp.
- Surface energy of liquids. *Mensbrugghe, G. van der. Rv. Un. Mines* 17 (1885) 163-.
- — as means of determining molecular complexity. *Ramsay, W. Rv. Sc.* 2 (1894) 1-.
- —, molecular, variation with temperature. *Ramsay, W., & Shields, J.* [1893] *Phil. Trans. (A)* 184 (1894) 647-.
- —, — — energy, molecular (Ramsay and Shields). *Mathias, —. Toul. Ac. Sc. Bll.* 2 (1899) 291-.
- Surface forces in liquids. *Worthington, A. M. R. S. P.* 36 (1884) 351-; *Ph. Mg.* 18 (1884) 334-.
- —, movements due to. *Fuchs, K. Exner Rpm.* 26 (1890) 444-.
- —, theory. *Rayleigh, (Lord). Ph. Mg.* 30 (1890) 285-, 456-; 33 (1892) 209-, 468-.
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- Prevost, B. A. C.* 21 (1797) 254-; 22 (1797) 111-.
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- Mensbrugghe, G. van der.* [1869-73] *Brux. Mm. Cour.* 4^e, 34 (1870) 67 pp.; 37 (1873) (No. 4) 32 pp.
- Duclaux, É. A. C.* 21 (1870) 378-.
- Moutier, J. J. de Ps.* 1 (1872) 98-; 2 (1873) 27-.
- Kraevich, K. D. (xii) Rs. C. Ps. S. J.* 7 (*Ps.*) (1875) [(*Pt.* 1)] 129-.
- Fitzgerald, G. F. B. A. Rp.* (1878) 436.
- Klupáty, J. Mth. Term. Ét.* 3 (1885) 94-; *Mth. Nt. B. Ung.* 5 (1886-87) 101-.
- Provenzali, F. S. Rm. N. Linc. At.* 39 (1886) 143-.
- (Leray.) *Mensbrugghe, G. van der. Brux. S. Sc. A.* 17 (1893) (*Pt.* 1) 91-.
- (Mensbrugghe.) *Leray, (le rév. père) —. Brux. S. Sc. A.* 18 (1894) (*Pt.* 1) 99-.
- (Leray.) *Mensbrugghe, G. van der. Brux. S. Sc. A.* 19 (1895) (*Pt.* 1) 60-.
- (Mensbrugghe.) *Leray, (le rév. père) —. Brux. S. Sc. A.* 19 (1895) (*Pt.* 1) 117-.
- (Leray.) *Mensbrugghe, G. van der. Brux. S. Sc. A.* 19 (1895) (*Pt.* 1) 120-.
- Foley, A. L. Ps. Rv.* 3 (1896) 381-.
- Mellberg, E. J. Helsingf. Acta* 22 (1897) No. 6, 38 pp.
- action of liquid of small, on gas dissolved in liquid of high surface tension. *Gernez, D. C. R.* 76 (1873) 89-.
- of alcohols and fatty acids. *Duclaux, É. A. C.* 13 (1878) 76-; *C. R.* 85 (1877) 1068-.
- aqueous solutions. *Forch, C. A. Ps. C.* 68 (1899) 801-.
- — of alkaline chlorides. *Linebarger, C. E. Am. C. S. J.* 21 (1899) 411-.
- calculation by means of flat drops. *Worthington, A. M. L. Ps. S. P.* 7 (1886) 145-; *Ph. Mg.* 20 (1885) 51-.
- and capillary action. *Reynolds, O. B. A. Rp.* (1881) 524-.
- at common surface of liquids and gases, influence of pressure. *Kundt, A. Berl. Ak. Mb.* (1880) 812-.
- and compressibility of liquids. *Röntgen, W. C., & Schneider, J. A. Ps. C.* 29 (1886) 165-.
- — —, connection. *Devaux, —. [1892] Bordeaux S. Sc. Mm.* 4 (1894) ii-.
- contact electrification, connection. *Gezechus [Hesekus], N. A. Rs. Ps.-C. S. J.* 31 (*Ps.*) (1899) 126-; *Fsch. Ps.* (1899) (*Ab.* 2) 473-.

- and contaminated water surfaces. *Pockels*, A. Nt. 43 (1891) 437-; 46 (1892) 418-; 48 (1893) 152-.
- critical temperature, connection. *Eötvös*, L. Mth. Term. Ét. 3 (1885) 54-.
- density of aqueous and alcoholic solutions of carbon dioxide and nitrous oxide. *Bellati*, M., & *Lussana*, S. Ven. I. At. (1888-89) 1169-.
- — — solutions, relation to state of ionisation. *Archibald*, E. H. [1897] N. Scotia I. Sc. P. & T. 9 (1898) 335-.
- — and conductivity of solutions of potassium chloride and sulphate. *Barnes*, J. [1899] N. Scotia I. Sc. P. & T. 10 (1903) 49-.
- dielectric constants of mixtures. *Gezechus* [*Hesehus*], N. A. Rs. Ps.-C. S. J. 32 (Ps.) (1900) 97-; *Fschr. Ps.* (1900) (Ab. 2) 405-.
- electric potential, dimensions. *Gezechus* [*Hesehus*], N. A. Rs. Ps.-C. S. J. 32 (Ps.) (1900) 115-; *Fschr. Ps.* (1900) (Ab. 2) 361-.
- of emulsions. *Budde*, E. A. Ps. C. (Berl. Ps. Gs. Vh. 1892) 46 (1892) 173-.
- ether and alcohol. *Ramsay*, W. B. A. Rp. (1891) 565-.
- — at high temperature. *Kasterin*, N. P. Rs. Ps.-C. S. J. 24 (Ps.) (1892) 196-; J. de Ps. 2 (1893) 529-.
- and evaporation, common cause. *Mensbrugge*, G. van der. C. R. 115 (1892) 1059-; *Brux. Ac. Bil.* 24 (1892) 543-; 25 (1893) 233-; 26 (1893) 37-; *Brux. S. Sc. A.* 17 (1893) (Pt. 1) 53-; 18 (1894) (Pt. 1) 49-.
- — and ebullition, mechanical theory. *Mensbrugge*, G. van der. *Brux. Ac. Bil.* 9 (1885) 346-; 10 (1885) 405-.
- experiments. *Norris*, R. R. S. P. 12 (1862-63) 251-.
- *Blondlot*, R. As. Fr. C. R. (1886) (Pt. 1) 101-.
- *Walsh*, A. R. *Dubl. S. Sc. P.* 5 (1886-87) 484-.
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- *Nichols*, E. Ps. Rv. 1 (1894) 299-.
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- of liquid films. *Terquem*, A. J. de Ps. 7 (1878) 406-.
- — —, and reflection of light. *Lehmann*, O. Z. Kr. 12 (1887) 399-.
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- — —, value at different heights. *Marangoni*, C. Rm. R. Ac. Linc. Rd. 5 (1889) (Sem. 1) 515-.
- — metals. *Gouy*, —. C. R. 114 (1892) 343-.
- — (Gouy). *Pellat*, H. C. R. 114 (1892) 464-.
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- , —, *Sentis*, H. C. R. 118 (1894) 1182-.
- , —, effect of temperature and concentration. *Ochsé*, W. Exner Rpm. 26 (1890) 641-.
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- — alcohol and mixtures, temperature variation, critical temperatures. *Sohet*, A. Liège S. Sc. Mm. 20 (1898) No. 1, 56 pp.
- , —, in various glasses. *Volkman*, P. A. Ps. C. 53 (1894) 633-; 62 (1897) 507-.
- , influence of electricity. *Nichols*, E. L., & *Clark*, J. A. Ps. Rv. 4 (1897) 375-.
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- , —, investigated by method of ripples. *Rayleigh*, (Lord). Ph. Mg. 30 (1890) 386-.

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- , —, —, measurement by capillary tubes. *Quincke*, G. [1894] A. Ps. C. 52 (1894) 1-; *Heidl. Nt. Md. Vh. 5* (1897) 228-.
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- , —, in narrow capillaries. *Volkman*, P. A. Ps. C. 66 (1898) 194-.
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- , —, —, *Lohnstein*, T. Z. Ps. C. 10 (1892) 504-.

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- , —, —, *Buys-Ballot*, C. H. D. Pogg. A. 71 (1847) 177-.
- , —, —, (Buys-Ballot). *Merian*, R. Pogg. A. 73 (1848) 485-.
- , —, —, *Frankenheim*, M. L. Pogg. A. 75 (1848) 229-; 77 (1849) 445-.
- , —, —, (Frankenheim). *Buff*, W. Pogg. A. 78 (1849) 578-.
- , —, —, *Wolf*, C. A. C. 49 (1857) 230-.
- , —, —, *Drion*, C. A. C. 56 (1859) 221-.
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- Knight*, T. Nicholson J. 27 (1810) 126-.
- La Place*, P. S. (marquis) de. Par. S. Phlm. Bll. (1819) 122-.
- Buquoy*, G. von. Oken Isis (1824) 1068-.
- Ivory*, J. Ph. Mg. 3 (1828) 1-.
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- Poisson*, S. D. A. C. 46 (1831) 61-.
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- Mousson, A.* Zür. Vjschr. 15 (1870) 305-.
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- Stahl, J.* A. Ps. C. 139 (1870) 239-.
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(See also Chemistry 7155.)

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- Magnanini, G.* *Rm. R. Ac. Linc. Rd.* 2 (1893) (Sem. 1) 416-.
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Thermal transpiration. *Reynolds, O. R. S. P.* 30 (1880) 300-.

Vapours. *Meyer, L.* Berl. B. 11 (1878) 206-; A. Ps. C. 7 (1879) 497-.

—, *Meyer, L., & Schumann, O.* Berl. B. 14 (1881) 593-; A. Ps. C. 13 (1881) 1-.

—, *Steudel, V. A.* Ps. C. 16 (1882) 369-.

—, *Meyer, L.* A. Ps. C. 16 (1882) 394-.

LIQUIDS.

Girard, P. S. Par. Mm. de l'I. (1813-15) 249-; Par. Mm. Ac. Sc. 1 (1816) 187-, 260-.

Lehot, C. J. Gilbert A. 65 (1820) 64-.

Poiseuille, J. L. M. Par. S. Phlm. PV. (1838) 1-; C. R. 11 (1840) 961-, 1041-; 12 (1841) 112-; Par. Mm. Sav. Étr. 9 (1846) 433-.

(Poisuille.) *Regnault, V.* C. R. 15 (1842) 1167-.

Poiseuille, J. L. M. C. R. 24 (1847) 1074-; A. C. 21 (1847) 76-.

Mathieu, É. C. R. 57 (1863) 320-.

(Poisuille.) *Boussinesq, J.* C. R. 65 (1867) 46-.

Tait, P. G. [1873] (xi) Edinb. R. S. P. 8 (1875) 208-.

Guerout, A. C. R. 78 (1874) 351-; 81 (1875) 1025-; 83 (1876) 1291-.

Nagy, J. Regéczy. [1883] (xii) Mag. Tud. Ak. Étk. (Term.) 13 (1884) (No. 7) 1-; Mth. Nt. B. Ung. 1 (1882-83) 232-.

Colson, A. C. R. 113 (1891) 740-.

Chemical composition, transpiration in relation to. *Graham, T. C. R.* 53 (1861) 774-; Phil. Trans. (1861) 373-.

Effect of temperature. *Guerout, A.* C. R. 79 (1874) 1201-.

Evaporation and transpiration, influence of electricity. *Wirtz, W.* A. Ps. C. 37 (1889) 516-.

Mercury. *Warburg, E.* A. Ps. C. 140 (1870) 367-.

—, *Villari, E.* Bologna Ac. Sc. Mm. 6 (1875) 487-.

Microthermometer, apparatus for measuring rate of transpiration. *Hannay, J. B.* [1878] Phil. Trans. 170 (1879) 275-.

—, Hannay's, viscosity of water determined by. *Barnett, R. E.* R. S. P. 56 (1894) 259-.

Passage through filters, capillary tubes, etc. *Brunhes, J.* [1879] Toul. Ac. Sc. Mm. 3 (1881) (App.) 161 pp.

Poisuille's law, deviations from. *Wetzstein, G.* A. Ps. C. 68 (1899) 441-.

—, lecture demonstration. *Röntgen, W. C.* A. Ps. C. 20 (1883) 268-.

Salt solutions. *Schulze, F.* C. CB. 3 (1872) 705-.

—, *Hübener, T.* A. Ps. C. 150 (1873) 248-.

Use of transpiration in science and technology. *Loewenthal, J.* Fresenius Z. 10 (1871) 298-; 11 (1872) 43-.

0325 Viscosity of Fluids

0325 Viscosity of Fluids (Internal Friction). (See also Chemistry 7170.)

- Lundquist, C. G.* Ups. Årsk. (1875) (*Mth.*) (No. 3) 26 pp.
Wijkander, E. A. [1878] A. Ps. C. Beibl. 3 (1879) 8-.
Slotte, K. F. Helsingf. Öfv. 32 (1890) 116-.
Mützel, K. A. Ps. C. 43 (1891) 15-; 44 (1891) 787.
Brodman, C. A. Ps. C. 45 (1892) 159-.
Slotte, K. F. Helsingf. Öfv. 37 (1895) 11-.
 Change of order of viscosity on passing from fluid to solid. *Barus, C.* Ph. Mg. 29 (1890) 337-.
 Damping of oscillations by air. *Sang, E.* Edinb. R. S. P. 16 (1890) 181-.
 — — in measuring instruments, by air. *Töpler, A.* A. Ps. C. 149 (1873) 416-.
 — — of solids in fluids. *Klemenčič, I.* [1881] Wien Ak. Sb. 84 (1882) (*Ab.* 2) 146-.
 Fluids in corresponding states. *Haas, M. de.* Amst. Ak. Vs. [2] (1894) 126-; 3 (1895) 62-.
 Measure, absolute, for viscosity. *Obermayer, A. von.* Carl Rpm. 15 (1879) 682-.

MEASUREMENT OF VISCOSITY.

- Margules, M.* Wien Ak. Sb. 83 (1881) (*Ab.* 2) 588-.
Redwood, B. S. C. In. J. 5 (1886) 121-; 6 (1887) 412.
Mills, E. J. S. C. In. J. 5 (1886) 148-.
McGill, A. [1894] Cn. Rc. Sc. 6 (1896) 153-.
Guye, P. A., & Friderich, L. Par. S. C. Bil. 19 (1898) 164-.
 correction for ends of tubes. *Couette, M. J. de* Ps. 9 (1890) 560-.
 improvements. *Kissling, R.* Z. Angew. C. (1896) 601-.
 and influence of magnetisation and electrification. *König, W.* A. Ps. C. 25 (1885) 618-.
 method. *Meyer, O. E.* A. Ps. C. 43 (1891) 1-; 44 (1891) 787.
 —, efflux. *Hagenbach, E.* Basel Vh. 2 (1860) 532-.
 —, Maxwell's. *Schmidt, T. S.* A. Ps. C. 16 (1882) 633-.
 — of oscillating discs. *Grossmann, L.* [1880] A. Ps. C. 16 (1882) 619-.
 — oscillations. *Meyer, O. E.* [1887] Münch. Ak. Sb. 17 (1888) 343-; Bresl. Schl. Gs. Jbr. (1887) 173-.

Viscosimeters.

- Babcock, S. M.* [1886] J. Anal. C. 1 (1887) 151-.
Engler, C. Z. Angew. C. (1892) 725-.
Lunge's. *Scheurer, F.* Mulhouse S. In. Bil. 66 (1896) 57-.
 for oils. *W., V.* Rv. Sc.-Ind. 18 (1886) 210-.

Viscosity of Gases 0325

- for oils. *Engler, C., & Kunkler, A.* Dingler 276 (1890) 42-; 279 (1891) 115-.
 — —. *Žukovskij, N. E.* Mosc. S. Sc. Bil. 73 (No. 1) (1891) 25-; Fsch. Ps. (1891) (*Ab.* 1) 262.
 — — (lubricating). *Kunkler, A.* Dingler 290 (1893) 281-.
 simple. *Wendrinier, M.* Z. Angew. C. (1894) 545-.
 —. *Kissling, R.* Z. Angew. C. (1894) 642.
 standards. *Engler, C.* Dingler 286 (1892) 210-.
 for sugar manufacture. *Dupont, F.* Z. Vr. Rübenzuckin. 47 (1897) (*Th.* 2) 926-.
 torsion-. *Doolittle, O. S.* Am. Eng. & Railroad J. 67 (1893) 583-.

- Oil and air, friction between. *Markovits, S.* Wien Ak. Sb. 100 (1891) (*Ab.* 2a) 785-.
 Pendulums, motion, effect of viscosity. *Stokes, G. G.* [1850] Camb. Ph. S. T. 9 (1856) [8]-.
 Physico-chemical investigation, new method. *Hannay, J. B.* Glasg. Ph. S. P. 11 (1879) 484-.
 Resistance and viscosity. *Rennie, G.* Phil. Trans. (1831) 423-.
 Theory. *Meyer, O. E.* Crelle J. Mth. 78 (1874) 130-; 80 (1875) 315-.
 Variation with chemical composition. *Handl, A., & Pfibram, R.* [1878-81] Wien Ak. Sb. 78 (1879) (*Ab.* 2) 113-; 80 (1880) (*Ab.* 2) 17-; 84 (1882) (*Ab.* 2) 717-.
 — density. *Warburg, E., & Babo, C. H. L.* von. A. Ps. C. 17 (1882) 390-.
 — temperature. *Barus, C.* Am. J. Sc. 44 (1892) 255.
 — — and chemical composition. *Graetz, —.* D. Nf. Tbl. (1887) 83.
 — — —, empirical formulæ. *Duff, A. W.* Ps. Rv. 4 (1897) 404-.
 — — —, Rosencranz's observations. *Meyer, O. E.* A. Ps. C. 2 (1877) 387-.
 — — velocity. *Élie, B. J.* de Ps. 1 (1882) 224-.

VISCOSITY OF GASES.

- Faraday, M.* A. C. 5 (1817) 298-.
Meyer, O. E. A. Ps. C. 125 (1865) 177-, 401-, 564-; 127 (1866) 253-, 353-; 148 (1873) 1-, 203-.
Meyer, O. E., & Springmühl, F. [1872] A. Ps. C. 148 (1873) 526-.
 Friction at a distance. *Govi, G.* Tor. At. Ac. Sc. 5 (1869-70) 199-.
 —, ethereal. *Stewart, B.* B. A. Rp. 43 (1873) (*Sect.*) 32-.
 —, —. *Hicks, W. M.* Camb. Ph. S. P. 2 (1876) 422-.
 Frictional or viscous resistance in the ether. *Rowland, H. A., Gilbert, N. E., & McJunkin, P. C.* J. H. Un. Cir. [19 (1899-1900)] 60.
 Gases at high exhaustions. *Crookes, W.* [1881] Phil. Trans. 172 (1882) 387-.
 — — —, decrement of arc of oscillating plate. *Stokes, G. G.* [1881] Phil. Trans. 172 (1882) 435-.
 — — — temperatures. *Barus, C.* Am. J. Sc. 35 (1888) 407-; A. Ps. C. 36 (1889) 358-.

- Heating of rotating disc *in vacuo*. *Stewart, B., & Tait, P. G.* R. S. P. 14 (1865) 90, 339-; 15 (1867) 290-; 21 (1873) 309-.
- — — — — (Stewart and Tait). *Meyer, O. E.* A. Ps. C. 135 (1868) 285-; 136 (1869) 330-.
- — — — — (Meyer). *Stewart, B., & Tait, P. G.* (xii) A. Ps. C. 136 (1869) 165-.
- Molecular force, and viscosity of gases. *Sutherland, W.* Ph. Mg. 36 (1893) 507-.
- Theory. *Boltzmann, L.* Wien Ak. Sb. 81 (1880) (Ab. 2) 117-; 84 (1882) (Ab. 2) 40-, 1230-.
- Variation with molecular volume. *Jäger, G.* Wien Ak. Sb. 108 (1899) (Ab. 2a) 447-; 109 (1900) (Ab. 2a) 74-.
- temperature. *Obermayer, A. von.* Wien Ak. Sb. 73 (1876) (Ab. 2) 433-.
- —. *Wiedemann, E. E. G.* Arch. Sc. Ps. Nt. 56 (1876) 277-.
- — (gases and vapours). *Schumann, O.* A. Ps. C. 23 (1884) 353-.
- —. *Breitenbach, P.* A. Ps. C. 67 (1899) 803-.
- —. *Rayleigh, (Lord).* [1900] R. S. P. 67 (1901) 137-.
- Very rarefied gas, apparatus for demonstrating friction in. *Kundt, A.* A. Ps. C. 158 (1876) 568-, 660.

Viscosity of Specified Gases.

- Air. *Schneebeli, H.* Arch. Sc. Ps. Nt. 14 (1885) 197-.
- , experiments. *Murray, J. E.* [1890] Glasg. Ph. S. P. 22 (1891) 199-.
- and other gases. *Maxwell, J. C.* Phil. Trans. 156 (1866) 249-.
- ; measurement. *Tomlinson, H.* [1886] Phil. Trans. 177 (1887) 767-, 795-.
- ; —. *Stokes, G. G.* [1886] Phil. Trans. 177 (1887) 786-.
- ; —. (Pendulums, effect of rotation of ball on logarithmic decrement.) *Stokes, G. G.* [1886] Phil. Trans. 177 (1887) 789-.
- ; —. *Fabry, C., & Perot, A.* C. R. 124 (1897) 281-; A. C. 13 (1898) 275-.
- ; —, Maxwell's method. *Meyer, O. E.* A. Ps. C. 143 (1871) 14-.
- ; — by oscillations. *Braun, W., & Kurz, A.* Carl Rpm. 18 (1882) 569-; 19 (1883) 343-.
- ; — —. *Meyer, O. E.* Carl Rpm. 18 (1882) 697-.
- ; — —. *Kurz, A.* Exner Rpm. 19 (1883) 605-.
- , passage through porous bodies with very small pressure differences. *Christiani, A.* Arch. An. Pl. (Pl. Ab.) (1882) 112-.
- , variation with temperature. *Obermayer, A. von.* Wien Ak. Sb. 71 (1875) (Ab. 2) 281-.
- , — —. *Holman, S. W.* [1876-86] Am. Ac. P. 12 (1877) 41-; 21 (1886) 1-.
- , — —. *Heen, P. de.* Brux. Ac. Bil. 16 (1888) 195-.
- Argon and helium. *Rayleigh, (Lord).* Nt. 52 (1895) 533; R. S. P. 59 (1896) 198-.
- , variation with temperature. *Rayleigh, (Lord).* R. S. P. 66 (1900) 68-.

- Hydrogen, variation with moisture. *Rayleigh, (Lord).* R. S. P. 62 (1898) 112-.
- Mercury vapour. *Noyes, A. A., & Goodwin, H. M.* [1896] Am. Ac. P. 32 (1897) 225-.
- , variation with temperature. *Koch, S.* A. Ps. C. 19 (1883) 857-.
- Steam at high temperatures. *Cantone, M.* Rm. R. Ac. Linc. Mm. 19 (1884) 253-.

VISCOSITY OF LIQUIDS.

- Heen, P. de.* Brux. Ac. Bil. 45 (1878) 798-.
- Marangoni, C.* (xii) Rv. Sc.-Ind. 11 (1879) 144-, 188-.
- Pagliani, S., & Battelli, A.* Tor. Ac. Sc. At. 20 (1885) 607-, 845-.
- Pagliani, S., & Oddone, E.* Tor. Ac. Sc. At. 22 (1886-87) 314-.
- Graetz, L.* A. Ps. C. 34 (1888) 25-.
- Perry, J. L.* Ps. S. P. 12 (1894) 236-; Ph. Mg. 35 (1893) 441-.
- Jones, O. G. L.* Ps. S. P. 13 (1895) 49-; Ph. Mg. 37 (1894) 451-.
- Petroff, N.* St. Pét. Ac. Sc. Bil. 5 (1896) 365-.
- Bibliography, 1800-1889. *Gee, W. W. H.* Manch. Lt. Ph. S. Mm. & P. 3 (1890) 123-.
- Definition. *Hagenbach-Bischoff, E.* Arch. Sc. Ps. Nt. 34 (1895) 377-.
- Elastic after-effect and viscosity. *Roiti, A.* N. Cim. 3 (1878) 5-.
- Electrolytes, solutions. *Euler, H.* Z. Ps. C. 25 (1898) 536-.
- Elements. *Pacher, G.* Ven. I. At. (1897-98) 516-.
- Figures of viscosity. *Issel, A.* Brux. S. Blg. Gl. Bil. (1889) (Mém.) 450-.
- Fluidity measurer, theory. *Heyer, —.* [1893] St. Gal. B. (1893-94) 93-.
- Kinetic theory. *Jäger, G.* Wien Ak. Sb. 102 (1893) (Ab. 2a) 253-.
- Liquid mixtures. *Linebarger, C. E.* Am. J. Sc. 2 (1896) 331-.
- —. *Thorpe, T. E., & Rodger, J. W.* C. S. J. 71 (1897) (Pt. 1) 360-.
- — and solutions. *Lees, C. H.* [1900] L. Ps. S. P. 17 (1901) 460-.
- —, viscosity, temperature and concentration. *Noack, K.* A. Ps. C. 27 (1886) 289-.
- Liquids above their boiling points. *Heydweiller, A.* Bresl. Schl. Gs. Jbr. (1896) (Ab. 2a) 1-; A. Ps. C. 59 (1896) 193-.
- in an electric field. *Pacher, G., & Finazzi, L.* Ven. I. At. (1899-1900) (Pt. 2) 389-.
- at same temperature and some at different temperatures, measurement of viscosity. *Ure, A. B. A. Rp.* (1839) (Pt. 2) 22-.
- Measurement. *Couette, M. C. R.* 107 (1888) 388-; A. C. 21 (1890) 433-.
- , experimental. *Vautier, T.* A. C. 15 (1888) 289-.
- , instruments. *McGill, A.* Cn. R. S. P. & T. 1 (1895) (Sect. 3) 97-.
- by rate of flow from capillary tube. *Wilberforce, L. R.* Ph. Mg. 31 (1891) 407-.
- torsional vibrations. *König, W.* A. Ps. C. 32 (1887) 193-.

Navier's equations, verification. *Couette*, —.
 Par. S. Ps. Sé. (1889) 60-, 108-.

Organic liquids and their aqueous solutions, specific viscosity. *Traube*, J. Berl. B. 19 (1886) 871-.

Rate of flow from capillary tube, influence of electricity. *Langer*, C. Exner Rpm. 25 (1889) 461-.

— — — of viscous liquids, application of graphic methods. *Vautier*, T. A. C. 15 (1888) 433-.

Rigidity. *Schwedoff*, T. [1889-1900] Par. S. Ps. Sé. (1889) 122-; Sc. Abs. 4 (1901) 353.

— and viscosity. *Schwedoff*, T. Par. S. Ps. Sé. (1889) 134-, 186-.

Salt solutions. *Brückner*, H. A. Ps. C. 42 (1891) 287-.

— — — *Moore*, B. E. Ps. Rv. 3 (1896) 321-.

— — — *Massoulier*, P. C. R. 130 (1900) 773-.

— — — and their mixtures. *Kanitz*, A. Z. Ps. C. 22 (1897) 336-.

— — — mixtures, relation to state of ionisation. *Barnes*, J. [1899] N. Scotia I. Sc. P. & T. 10 (1903) 113-.

Solutions. *D'Arcy*, R. F. Ph. Mg. 28 (1889) 221-.

— — — *Jäger*, G. Wien Ak. Sb. 103 (1894) (Ab. 2a) 251-; Mh. C. (1894) 254-.

— — — anhydrous. *Smoluchowski*, M. von. Wien Ak. Sb. 102 (1893) (Ab. 2a) 1136-.

— — — aqueous. *Reyher*, R. Z. Ps. C. 2 (1888) 744-.

— — — dilute. *Arrhenius*, S. Z. Ps. C. 1 (1887) 285-.

— — — at temperature of maximum density. *Pacher*, G., & *Finazzi*, L. Ven. I. At. (1899-1900) (Pt. 2) 1033-.

— — — viscosity, and variation of viscosity of water with temperature. *Slotte*, K. F. A. Ps. C. 20 (1883) 257-.

Supercooled liquids. *Tammann*, G. Z. Ps. C. 28 (1899) 17-.

Superficial viscosity. *Marangoni*, C. (x) N. Cim. 5 & 6 (1871) 239-.

— — — *Luvini*, G. (xii) Rv. Sc.-Ind. 4 (1872) 262-.

— — — (Marangoni). *Plateau*, J. A. F. Brux. Ac. Bil. 34 (1872) 404-; 48 (1879) 106-.

Variation with chemical composition. *Thorpe*, T. E., & *Rodger*, J. W. [1894-96] Phil. Trans. (A) 185 (1895) 397-; (A) 189 (1897) 71-.

— — — — *Thorpe*, T. E. [1898] R. I. P. 15 (1899) 641-.

— — — density. *Warburg*, E., & *Sachs*, J. A. Ps. C. 22 (1884) 518-.

— — — pressure. *Röntgen*, W. C. A. Ps. C. 22 (1884) 510-.

— — — *Cohen*, R. A. Ps. C. 45 (1892) 666-.

— — — temperature. *Heen*, P. de. Brux. Ac. Bil. 7 (1884) 248-; 11 (1886) 29-.

— — — vapour pressure. *Heen*, P. de. Brux. Ac. Bil. 10 (1885) 251-.

Very viscous liquids. *Schöttner*, F. Wien Ak. Sb. 79 (1879) (Ab. 2) 477-.

— — — *Brodmann*, C. A. Ps. C. 48 (1893) 188-.

Viscosity of Specified Liquids.

Acetic acid, pure, and in solution. *Noack*, K. A. Ps. C. 28 (1886) 666-.

Benzene and ethyl ether above their boiling point. *Heydweiller*, A. A. Ps. C. 55 (1895) 561-.

Bromine, variation with temperature. *Kann*, L. Wien Ak. Sb. 106 (1897) (Ab. 2a) 431-.

Chromates, solutions. *Slotte*, K. F. A. Ps. C. 14 (1881) 13-.

Gelatin solution, viscosity and electrolytic resistance. *Griffiths*, A. Manch. Lt. Ph. S. Mm. & P. 41 (1897) ix-.

Glycerin. *Schöttner*, F. Wien Ak. Sb. 77 (1878) (Ab. 2) 682-.

— — — a periodic damping applied to viscosity measurement. *Riecke*, E. A. Ps. C. 51 (1894) 156-.

— — — solutions. *Schall*, C., & *Rijn*, W. van. Z. Ps. C. 23 (1897) 329-.

Mercury. *Umami*, A. N. Cim. 3 (1896) 151-.

— — — and amalgams, viscosity and electrical conductivity. *Schweidler*, E. (Ritter) von. Wien Ak. Sb. 104 (1895) (Ab. 2a) 273-.

— — — variation with temperature. *Koch*, S. A. Ps. C. 14 (1881) 1-.

Methyl chloride between boiling point and critical point. *Haas*, M. de. Amst. Ak. Vs. [2] (1894) 123-.

Oils, variation with temperature. *Garvanoff*, J. G. Wien Ak. Sb. 103 (1894) (Ab. 2a) 873-.

Saponine solution, superficial viscosity of films. *Mensbrugghe*, G. van der. Brux. Ac. Bil. 29 (1870) 368-.

Sulphur, fused. *Pisati*, G. Palermo G. Sc. Nt. 12 (1877) (Pt. 1) 33-.

Water. *Geoffroy*, L. C. R. 88 (1879) 573-.

— — — *Mallock*, A. R. S. P. 45 (1889) 126-.

— — — *Pacher*, G. Ven. I. At. (1898-99) (Pt. 2) 785-.

— — — discharge from pipes, influence of temperature. *Baumgartner*, G. A. Ps. C. 153 (1874) 44-.

— — — — — (Baumgartner). *Meyer*, O. E. A. Ps. C. 153 (1874) 619-.

— — — at different temperatures. *Mair*, J. G. I. CE. P. 84 (1886) 424-.

— — — "drag" upon water at low velocities. *Haughton*, S. B. A. Rp. (1879) 275-.

— — — — — and of air upon air. *Haughton*, S., & *Reynolds*, J. E. [1880] Ir. Ac. P. 3 (1883) 277-.

— — — measurement of viscosity by efflux method. *Knibbs*, G. H. N. S. W. R. S. J. 29 (1895) 77-; 30 (1897) 186-.

— — — — — Hannay's microrheometer. *Barnett*, R. E. R. S. P. 56 (1894) 259-.

— — — variation with temperature. *Gerstner*, F. J. von. Gilbert A. 5 (1800) 160-.

0340 Colloidal Substances.

- Absorption and colloids. *Bemmelen, J. M. van.* Z. Anorg. C. 13 (1897) 233-; 18 (1898) 14-, 98-.
- , Isothermals of colloidal iron oxide. *Bemmelen, J. M. van.* Z. Anorg. C. 20 (1899) 185-.
- Colloid films, spiral cracks formed during drying. *Rhumbler, L.* Ps. Z. 1 (1900) 41-.
- metallic solutions, nature. *Stoeckl, K., & Vanino, L.* Z. Ps. C. 30 (1899) 98-.
- — —, (Stoeckl & Vanino). *Zsigmondy, R.* Z. Ps. C. 33 (1900) 63-.
- — —, (Zsigmondy). *Stoeckl, K., & Vanino, L.* Z. Ps. C. 34 (1900) 378-.
- solutions. *Bredig, G., & Coehn, A.* Z. Ps. C. 32 (1900) 129-.
- , coagulation. *Stark, J. A.* Ps. C. 68 (1899) 618-.
- , —, speed. *Linebarger, C. E.* Am. C. S. J. 20 (1898) 375-.
- , freezing. *Ijubawin, N.* Berl. B. 22 (1889) (Ref.) 727-.
- , gold. *Zsigmondy, —.* Z. Elektch. (1897-98) 546-.
- , nature. *Barus, C., & Schneider, E. A.* Z. Ps. C. 8 (1891) 278-.
- , —, *Linebarger, C. E.* Am. J. Sc. 43 (1892) 218-.
- , physical behaviour. *Lüdeking, C. A.* Ps. C. 35 (1888) 552-.
- , silver. *Capranica, S., & Carbonelli, E.* Genova S. Lig. At. 5 (1894) 279-.
- , stability. *Hardy, W. B.* Z. Ps. C. 33 (1900) 385-.
- , theory. *Krafft, F.* Berl. B. 29 (1896) 1334-.
- Colloidal state of metals. *Lottermoser, A.* D. Nf. Vh. (1899) (Th. 2, Hälfte 1) 122-.
- Colloids. *Wiedemann, E.* Berl. Ps. Gs. Vh. (1884) 44-.
- , constitution. *Bourgeois, A., & Schützenberger, P.* C. R. 82 (1876) 262-.
- , influence on forms of inorganic matter. *Ord, W. M.* St. Thom. Hosp. Rp. 2 (1871) 1-.
- , — — —, and molecular coalescence. *Ord, W. M.* QJ. Mer. Sc. 12 (1872) 219-.
- , nature, and circumstances of formation and transformation. *Bemmelen, J. M. van.* Rec. Tr. C. P.-Bas 7 (1888) 37-, 118.
- and oils, mechanical properties. *De-Metz [De Metz], G. G.* N. Rs. S. Nt. Mm. (Mth.) 9 (1889) 139-.
- , phenomena of drying. *Gladstone, J. H., & Hibbert, W.* B. A. Rp. (1899) 709.
- , physical condition. *Pauli, W., & Rona, P.* Wien Az. 37 (1900) 282-.
- Deposition of clays. *Hunt, T. S.* Bost. S. N. H. P. 16 (1874) 302-.
- , pulverulent bodies in liquids. *Scheerer, T.* Pogg. A. 82 (1851) 419-.
- Flocculation of particles. *Hilgard, E. W.* Am. J. Sc. 17 (1879) 205-.
- , turbid media. *Spring, W.* Brux. Ac. Bil. (1900) 483-.

- Muddy waters, clarification. *Darcet, F. A.* Hyg. Pbl. 4 (1830) 375-.
- , clarifying action of alum. *Jennet, C.* C. R. 61 (1865) 598-; Mon. Sc. 7 (1865) 1007-.
- Precipitation, false. *Stark, J. A.* Ps. C. 68 (1899) 117-.
- of mud by very dilute saline solutions. *Schlesing, T.* C. R. 70 (1870) 1345-.
- Sedimentary phenomena, and their connection with allied physical conditions. *Schulze, F. A.* Ps. C. 129 (1866) 366-.
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- Attraction, material, and gravity in particular, nature. *Robida, K.* [1870] (xn) *Kärnten Landms. Jb.* 10 (1871) 172-.
- , Newtonian, flux of mechanical energy for motion of bodies under. *Volterra, V.* Tor. Ac. Sc. At. 34 (1898) 238- or 366-, 601- or 805-; N. Cim. 10 (1899) 337-.
- , and natural phenomena. *Séguin, — (ainé).* Moigno Cosmos 18 (1861) 681-.
- , new method of symbolising. *Hamilton, (Sir) W. R.* Ir. Ac. P. 3 (1847) 344-.
- , theory, by Maxwell's method. *Gosiewski, W.* Prace Mt.-Fiz. 8 (1897) 178-; *Fschr. Ps.* (1898) (Ab. 1) 388-.
- , universal. *Laborde, —.* Les Mondes 55 (1881) 356-.
- , law. *Smythies, J. K.* R. S. P. 5 (1849) 831-.
- , and magnetism. *Maggi, P. G.* Verona Mm. Ac. Ag. 25 (1851) 131-.
- , — — —. *Sludskii, T. A.* (xn) *Rec. Mth. (Moscou)* 3 (1868) (Pt. 2) 123-.
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- and repulsive forces, and action through a medium. *Tannery, P.* J. de Ps. 6 (1877) 242-.
- — — — —, generation by fluid pressures. *Tannery, P.* Bordeaux S. Sc. Mm. 2 (1878) 95-.

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— — —, alleged connection. *Schüller, A.* [1875] (xii) *Mag. Tud. Ak. Ètk. (Term.)* 6 (1876) (No. 4) 8 pp.

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Quartz crystals, directive action. *Poynting, J. H., & Gray, P. L.* [1898] Phil. Trans. (A) 192 (1899) 245-.

Repulsion. *Heath, D. D.* Nt. 30 (1884) 490.

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— research, present state. *Lehmann, C. F.* Z. Ethnl. 26 (1894) (188)-.

— studies. *Wild, H. [I.]* St. Pét. Ac. Sc. Mm. 18 (1872) (No. 8) 26 pp.; 23 (1877) (No. 8) 22 pp.

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- Absolute and gravitation systems. *Slate, F.* Nt. 44 (1891) 445.
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- , *Kistjakovskij, V.* Rs. Ps.-C. S. J. 25 (Ps.) (1893) 81-; J. de Ps. 3 (1894) 237.
- and measurement in mechanics. *Kiel, —.* Bonn Niedr. Gs. Sb. (1896) 80-.
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- , —, and dimensions of physical quantities. *Krebs, —.* Cztg. Opt. 10 (1889) 7-.
- , —, electrical units. *Géraldy, F.* Lum. Élect. 5 (*1881) 181-, 216-.
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- —, use. *Peddie, W.* Edinb. Mth. S. P. 9 (1891) 30-; 11 (1893) 7.
- Dimensions method, application to proof of physical theorems. *Neesen, F. A.* Ps. C. 7 (1879) 329-.
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- , theory. *Sluginov, N. P.* (xn) Rs. Ps.-C. S. J. 16 (Ps., Pt. 1) (1884) 49-, 238-; Fsch. Ps. (1884) (Ab. 1) 28-.
- , —, *Abraham, H.* J. de Ps. 1 (1892) 516-.
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- Micrometric unit (micron μ). *Cornet, —.* [1880] Brux. S. Blg. Mer. Bll. 6 (*1882) cxxvi-.
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- Babylonian measure and weight and their variations. *Lehmann, C. F.* Z. Ethnl. 21 (1889) (245)-, (642)-.
- British standards. *Lucas, R. B.* [1885] S. Aust. R. S. T. 9 (1887) 18-.
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- Comparison of standards of France, Russia and Great Britain. (With tables.) *Mendeleeff, D.* Par. Poids et Mes. PV. (1897) 155-.
- Cube, cylinder and sphere, Sir G. S. Evelyn's, remeasurement. *Kater, H.* Phil. Trans. (1821) 316-.
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- with 1/16-inch as basis. *Holland, J. S.* (vi Adds.) Glasg. T. I. Eng. 1 (1857-58) 39-.
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- , —, recent discoveries. *Anon.* (vi 152) Bb. It. 53 (1829) 200-.
- Fundamental standards of length and mass. *Mendenhall, T. C.* U. S. Coast Geod. Sv. Bll. No. 26 (1893) 1-.
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- , —, *Hirsch, A., & Ibañez, (gén.)* —. Par. Poids et Mes. PV. (*1882) 28-.
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- , (Curvimeter.) *Hammer, E.* Z. Instk. 15 (1895) 278-.
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- , dioptric. *Werner, W.* (xii) Z. Instk. 1 (1881) 137-.
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— — —. (Barré's). *Delisle, —.* *Lille Tr.*
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— — —. (— — —). *Heuer, K., & Reinicke,*
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— — —, variation. *Börgen, —.* *A. der Hydrog.*
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- , —, and free pendulum. *Appel*, D. Z. Instk. 12 (1892) 19-, 165.
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- , —, detached. *Young*, C. A. Spet. It. Mm. 6 (1877) (App.) 73-.
- of Hipp chronograph, and measurement of small intervals of time. *Briggs*, R. Franklin I. J. 73 (1877) 89-.
- , new pendulum-. *Leman*, —. As. & Asps. 12 (1893) 882-.
- for standard clock. *Appel*, D. Z. Instk. 7 (1887) 29-.
- Escapements. *Reid*, T. Nicholson J. 5 (1802) 55-.
- *Veladini*, G. Mil. G. I. Lomb. 7 (1846) 127-.
- , chronometer-. *Rodanet*, A. H. Cg. Int. Chron. (1900) 34-.
- , —, classification. *Ditisheim*, P. Cg. Int. Chron. (1900) 40-.
- , clock-. *Wagner*, J. Par. Bl. S. Encour. 46 (1847) 3-.
- , —. *Denison*, E. B. [1848] Camb. Ph. S. T. 8 (1849) 633-.
- , —. *Fulton*, J. Silliman J. 11 (1851) 406-.
- , —. *Bloxam*, J. M. [1853] As. S. Mm. 22 (1854) 103-; 27 (1859) 61-.
- , compensations, etc., of clocks and chronometers, modern. *Antoine*, E. Cg. Int. Chron. (1889) 43-.
- Globe time-piece. *Allison*, B. Philad. T. 5 (1802) 82-.
- History of time-measurement. *Golfarelli*, I. Firenze Ac. Georg. At. 21 (1898) 287-.
- Horoscope, Eble's, theory (movable sundial). *Radau*, R. Les Mondes 8 (1865) 588-.
- Metronomes, construction. *Bruno*, F. F. de. Moigno Cosmos 7 (1855) 363-.
- Pendulum, electric motor. *Higgs*, R. W. H. P. [1876] Nt. 15 (1877) 98.
- , —, precision-, Neuchâtel Observatory. *Favarger*, A. Lum. Élect. 20 (1886) 206-.
- , —, regulator for. *Bourbouze*, —. C. R. 83 (1876) 482-.
- , free, as time standard. *Mendenhall*, T. C. Am. J. Sc. 43 (1892) 85-.
- , Helmholtz, modification. *Kleiner*, A. Arch. Sc. Ps. Nt. 8 (1899) 375-.
- Phenomena of the time-infinitesimal. *Nichols*, E. L. Am. As. P. (1893) 57-.
- Phonic wheel for regulating synchronism of motion. *La Cour*, P. C. R. 87 (1878) 490-; (xm) Sk. Nt. Môt. F. (1880) 133-; Tel. J. 21 (1887) 331-, 359-, 529.

- Physical experiments, time measurements in. *Aldini*, G. Bologna Mm. I. It. 1 (pte. 2) (1806) 487-.
- Rotation time, absolute measurement. *Prytz*, K. A. Ps. C. 43 (1891) 638-.
- of axis and vibration time of tuning fork, ratio. *Prytz*, K. A. Ps. C. 43 (1891) 652-.
- , —, and periodic time of tuning fork, measurement. *Jones*, J. V. L. Ps. S. P. 10 (1890) 97-; Ph. Mg. 27 (1889) 349-.
- Small intervals, measurement. *Pouillet*, C. S. M. C. R. 19 (1844) 1384-.
- , —. *Tygna*, E. Rio Obs. Rv. (1886) 105-.
- , —, apparatus. *Aldini*, G. Bb. Un. 51 (1832) 77-.
- , —, —. *Hankel*, W. G. Leip. B. 18 (1866) 46-.
- , —, —. *Gieseler*, E. Bonn Niedr. Gs. Sb. (1875) 304-.
- , —, —, duration of electroscopic double refraction and magnetic rotation. *Abraham*, H., & *Lemoine*, J. Par. S. Ps. Sé. (1899) 155-; A. C. 20 (1900) 264-.
- , —, electrical. *Sabine*, R. Ph. Mg. 1 (1876) 337-.
- , —, photographic. *Stein*, S. T. Wien Ph. Cor. 14 (1877) 183-, 277-.
- , —, —. *Mareschal*, G. Gén. Civ. 20 (1891-92) 152-.
- , —, —. *Lavergne*, G. Gén. Civ. 21 (1892) 381-.
- Sundial, azimuthal. *Decante*, —. Rv. Mar. et Col. 46 (1875) 222-.
- , cylindrical, Mâcon. *Mayette*, —. Mâcon Ac. A. 5 (1885) 401-.
- , horizontal. *Donovan*, M. Ir. Ac. P. 7 (1858) 111-.
- , —, elliptic, Dijon, 1827. *Perret*, A. N. A. Mth. 15 (1856) 399-.
- , —, —, —. *Dumay*, —. [1899] Dijon Ac. Sc. Mm. 7 (1901) xix-.
- , new. *Decohorne*, —. C. R. 113 (1891) 481.
- , portable. *Viala*, E. Mntp. Ac. Sc. Mm. 5 (1861-63) 155-.
- , — (Sonnerring). *Karsten*, G. [1893] Schl.-Holst. Nt. Vr. Schr. 10 (1895) 66-.
- , universal, Sharp's. *Robinson*, T. R. B. A. Rp. (1849) (pt. 2) 34.
- Sundials. *Littrow*, J. J. von. Baumgartner Z. 9 (1831) 148-.
- , adjustment. *Patterson*, R. [1817] Am. Ph. S. T. 1 (1818) 333-.
- , construction. *Francaeur*, L. B. Gergonne A. Mth. 8 (1817-18) 233-; 9 (1818-19) 91-.
- , —, graphical. *Kahrer*, G. Wien Jbr. Ober-Realsh. Inn. Stadt 5 (1863) 1-.
- , —, new method. *Servier*, —. Rv. Sc. 49 (1892) 366-.
- , globes for. *Avit*, —. Le Puy A. S. Ag. (1827) 189-.
- Telechronometer. *Ungerer*, —. Cg. Int. Chron. (1889) 189-.
- Telephonic time-transmitter. *Harrington*, M. W. Science 1 (*1883) 302-.

- Temperature and time, measurement, analogy. *Macgregor, J. G.* [1887] N. Scotia I. Sc. P. & T. 7 (1890) 20-.
- Time determination in study of relative gravitation. *Saija, G.* Spet. It. Mm. 28 (1900) 65-.
- regulation, with alternating currents. *Bohmeyer, C.* Elekttech. Z. 8 (1887) 503-.
- signals, correction of errors in distribution. *Grubb, (Sir) H.* [1898] Dubl. S. Sc. P. 9 (1899-1902) 37-.
- , electric. *Carhart, H. S.* Science 3 (1884) 401.
- , —, method of making. *Mell, P. H.* (jun.) Science 2 (*1883) 823.
- , —, —, —. M. Science 3 (1884) 59.
- , —, telegraphy. *Hirsch, A.* Neuch. Bll. 6 (1861-63) 373-.
- Watch with ball bearings for balance, trials. *Maillard-Salin, —.* Cg. Int. Chron. (1900) 63-.
- , rocking, rates of, and gravitational pendulum. *Barus, C.* Ph. Mg. 50 (1900) 595-.
- Watches, compensation curb. *Scott, J.* Nicholson J. 11 (1805) 19-.
- , —. *Hardy, W.* Nicholson J. 20 (1808) 138-.
- , magnetised. *Lewis, W. T.* Franklin I. J. 143 (1897) 60-.
- , mainspring, theory. *Young, Alex.* Franklin I. J. 24 (1852) 344-.
- , Paillard palladium alloys in. *Houston, E. J.* Am. Ph. S. P. 25 (1888) 129-.
- , Paillard's non-magnetic balance and hair-spring. *Houston, E. J.* Franklin I. J. 125 (1888) 238-.
- and other time-pieces, influence of magnetism. *Varley, S.* Tilloch Ph. Mg. 1 (1798) 16-.
- , trains. *Pearson, W.* Nicholson J. 5 (1802) 46-.

0810 Measurement of Mass and Density. Balance.

(See also Chemistry 7115.)

MASS.

- Francke, A.* Hann. Archt.-Vr. Z. 20 (1874) 539-.
- Air, weight of litre. *Broch, O. J.* Par. Poids et Mes. Tr. Mm. 1 (*1881) A. 49-.
- , —, —, and density of gases. *Leduc, A.* C. R. 117 (1893) 1072-.
- , —, — (Regnault); water, density at 4° C. and at 0° C. *Kohrausch, R.* Pogg. A. 98 (1856) 178-.
- , —, — millilitre. *Marek, W. J.* Par. Poids et Mes. Tr. Mm. 1 (*1881) D. 26-.
- Carbon dioxide in air of weighing room. *Dobrochotov, A.* Rs. Ps.-C. S. J. 29 (Ps.) (1897) (App.) 85-.
- Coins, system of adjusting to standard in weight. *Smith, J. T.* Madras Eng. Rp. 2 (1846) 205-.

- Electricity, application to weighing. *Decharme, C.* Lum. Elect. 19 (1886) 15-.
- , free, influence on exact weighing. *Ekman, F. L.* Stockh. Öfv. 17 (1860) 279-.
- Gas weighed by Aristotle. *Erman, P.* Gilbert A. 16 (1804) 385-.
- Gases, weights, new method of determining. *Potter, J.* [1827] Manch. Ph. S. Mm. 5 (1831) 195-.
- Kilogramme, comparison of types, weighing observations. *Broch, O. J.* Par. Poids et Mes. Tr. Mm. 4 (1885) 1-.
- , standard III, volume. *Broch, O. J.* Par. Poids et Mes. Tr. Mm. 4 (1885) 23-.
- , —, weighings. *Dumas, J. B., et alii.* Par. Poids et Mes. Tr. Mm. 4 (1885) 1-.
- Metallic globules, minute, method of finding weight without balance. *Byrne, O.* (vi Adds.) Chemist 5 (1844) 241-.
- Pendulum, weighing by means of. *Fuchs, K.* Exner Rpm. 26 (1890) 634-.
- Water, cubic decimetre, mass. *Fabry, C., Macé de Lépinay, J., & Pérot, A.* C. R. 129 (1899) 709-.
- , —, weight. *Wild, H.* A. Cons. Arts et Mét. 10 (*1873) 106-.
- , —, —. *Mendeleëff, D.* R. S. P. 59 (1896) 143-.
- , —, —. *Chappuis, —.* Par. Poids et Mes. PV. (1897) 125-.
- , —, —. *Guillaume, C. É.* Par. Poids et Mes. PV. (1899) 143-.
- , —, foot, weight. *Hadly, R. J.* Par. S. Phlm. Bll. 1 (1791) 39-.
- , —, inch, weight. *Kupffer, A. T.* Erdm. J. Pr. C. 22 (1841) 62-.
- , distilled, cubic decimetre, mass at maximum density. *Macé de Lépinay, J.* C. R. 120 (1895) 770-; 122 (1896) 595-; Par. S. Ps. Sé. (1896) 191-; A. C. 11 (1897) 102-.
- , —, —, weight at maximum density. *Wild, H.* [1870] St. Pét. Ac. Sc. Bll. 15 (1871) 58-.
- , —, —, inch, weight. *Chaney, H. J.* [1892] Phil. Trans. (A) 183 (1893) 331-.
- , —, —, —, and specific gravity of air. *Rice, E. W. M.* Thomson A. Ph. 13 (1819) 339-; 14 (1819) 73-.
- , true weight. *Studer, J. G.* Gilbert A. 13 (1803) 122-.
- , weight, experiment. *Svanberg, J.* Stockh. Ak. Hndl. (1825) 1-; Qf. Sc. 22 (1827) 152-.
- Weighing, accurate. *Schuster, A.* Manch. Lt. Ph. S. Mm. & P. 7 (1893) 74-.
- , —. *Mendeleëv, D.* Rs. Ps.-C. S. J. 29 (Ps.) (1897) (App.) 1-; J. de Ps. 6 (1897) 613-.
- , in air, correction. *Fontana, A.* N. Cim. 3 (1896) 324-.
- , art of. *Hansteen, C. N.* Mg. Ntvd. 6 (1851) 1-.
- , correction for buoyancy of air when volume is unknown. *Cooke, J. P.* Am. Ac. P. 18 (1883) 55-.
- , corrections. *Rühlmann, R.* Carl Rpm. 4 (1868) 177-.
- , —. *Bauer, K. L.* Carl Rpm. 4 (1868) 323-; 5 (1869) 332-.

- Weighing, corrections (Bauer). *Rühlmann, R.* Carl Rpm. 5 (1869) 320-.
- , direct determination of weight of displaced air. *Richarz, F.* Berl. Ps. Gs. Vh. (1886) 83 (bis)-.
- , limits of accuracy in ordinary. *Folkard, C. W.* C. N. 29 (1874) 20.
- , theory, formulæ, constants and tables. *Marek, W. J.* Par. Poids et Mes. Tr. Mm. 3 (1884) D. 53-.
- in water, methods and results. *Marek, W. J.* Par. Poids et Mes. Tr. Mm. 1 (*1881) D. 43-; 2 (*1883) D. 58-; 3 (1884) D. 75-.
- Weighings, reduction. *Seidel, L., & Steinheil, —.* Münch. Gelehrte Az. 26 (1848) 301-.
- , to vacuum. *Schottländer, P.* Z. Ps. C. 16 (1895) 458-.
- , —, —. *Salomon, F.* Z. Angew. C. (1896) 529-.
- Weights, accuracy. *Dibbitts, H. C.* (xii) Mbl. Nt. 9 (1879) 120-.
- , best series. *Krönig, A. A.* Ps. C. 122 (1864) 593-.
- , correction-. *Verbeek, A. T. H.* Arch. Mth. Ps. 62 (1878) 333-.
- , new, description. *Prieur, C. A.* A. C. 20 (1797) 274-.
- , proposed new form. *Séguier, A., & Delamorinière, —.* C. R. 44 (1857) 531-.
- , small, estimation. *McMayer, A.* Silliman J. 25 (1858) 39-.
- , variation by minute amounts. *Brown, J. A.* [1867] Edinb. R. S. P. 6 (1869) 167-.
- DENSITY.
- Littleton, N. L.* Md. Ps. J. 40 (1818) 269-.
- Schiff, H.* Lieb. A. 107 (1858) 59-.
- Tilden, W. A.* C. N. 38 (1878) 300-.
- Krebs, G.* Carl Rpm. 17 (1881) 661-.
- Lermantov, V. V.* Rs. Ps.-C. S. J. 17 (Ps.) (1885) 56-; J. de Ps. 5 (1886) 91.
- Sollas, W. J.* Nt. 43 (1891) 404-.
- Neufville, R. de.* Frkf. a. M. Ps. Vr. Jbr. (1891-92) 41.
- Hallo, W.* [1900] N. Y. Ac. A. 13 (1900-01) 476.
- Absolute density. *Sluginov, N. P.* Rs. Ps.-C. S. J. 19 (Ps.) (1887) 36-.
- Air, influence on density determinations and accuracy of weighings. *Demichel, A. A.* C. Anal. 3 (1898) 300-.
- Densities should be compared with that of water at maximum density. *Coze, J. R.* Thomson A. Ph. 7 (1816) 234.
- Density and specific gravity. *Lamy, A.* Lille Mm. S. (1853) 9-.
- Errors in determination. *Rose, G.* Pogg. A. 73 (1848) 1-.
- Practical rules for exact determination. *Kohlrausch, R.* Marb. Schr. 8 (1857) 1-.
- DENSITY OF GASES.
- Thomson, T.* Thomson A. Ph. 1 (1813) 177-.
- Gay-Lussac, L. J.* A. C. 1 (1816) 218-.
- Berzelius, J. J., & Dulong, P. L.* A. C. 15 (1820) 386-.
- Thomson, T.* Thomson A. Ph. 15 (1820) 232-; 16 (1820) 161-, 241-.
- Hare, R.* Silliman J. 16 (1829) 293-.
- Regnault, V.* C. R. 20 (1845) 975-.
- Wagner, A.* (Chem.) Carl Rpm. 12 (1876) 60-.
- Chancel, G.* C. R. 94 (1882) 626-.
- Goldschmidt, H., & Meyer, V.* Berl. B. 15 (1882) 137-.
- Agamennone, G.* Rm. R. Ac. Linc. Rd. 1 (1885) 105-.
- Lux, F.* Fresenius Z. 25 (1886) 3-.
- Rayleigh, (Lord).* R. S. P. 43 (1888) 356-; 50 (1892) 448-; 53 (1893) 134-.
- Cooke, J. P.* Am. Ac. P. 24 (1889) 202-.
- Joly, J.* Dubl. S. Sc. P. 6 (1888-90) 534-.
- Geronzi, B.-T.* Rv. Sc.-Ind. 23 (1891) 228-.
- Moissan, H., & Gautier, H.* C. R. 115 (1892) 82-; A. C. 5 (1895) 568-.
- Meslans, M.* C. R. 117 (1893) 386-.
- Fresenius, W.* [1900] Nass. Vr. Jb. 54 (1901) XLII-.
- Air.* *Agamennone, G.* Rm. R. Ac. Linc. Rd. 1 (1885) 111-.
- , densimeter for. [Barilli, G.] *Filopanti, Q.* Bologna Rd. (1867) 83-.
- Apparatus. *Schlesing, T. (fils)* C. R. 126 (1898) 220-, 476-.
- for rapid determination. *Meslans, —.* Par. S. Phlm. Bil. 4 (1892) (C.R., No. 20) 2.
- Barothermometer. *Salomon, F.* Z. Angew. C. (1892) 45-.
- Bunsen's method, improvement. *Mendenhall, T. C.* Am. As. P. (1875) (Pt. 1) 112-.
- Correction for moisture. *Apjohn, Jas.* B. A. Rp. (1831-32) 570-.
- Dasymeter and air-pyrometer of Siebert and Dürr. *H. Oestr. Z. Brgw.* 41 (1893) 291-.
- for furnace gases. *Hauß, —.* Z. Vr. Rübenzuckin. 43 (1893) 399-.
- Gas and vapour densities. *Regnault, V. A.* C. 63 (1861) 45-.
- — —. *Bunsen, R. W.* A. C. Phm. 14f (1867) 273-.
- — —. *Mohr, C. F.* Bonn Sb. Niedr. Gs. (1869) 73-.
- — —, manometric estimation. *Müller, F. C. G.* Z. Angew. C. (1890) 513-.
- Gas-baroscope. *Bodländer, G.* Berl. B. 27 (1894) 2263-; Z. Angew. C. (1894) 425-.
- Gases at high temperatures. *Crafts, J. M.* C. R. 90 (1890) 309-.
- Immersed solids, measurement by. *Fitzgerald, G. F.* Dubl. S. Sc. P. 4 (1885) 481-.
- Influence of deformation of bulb. *Agamennone, G.* Rm. R. Ac. Linc. Rd. 5 (1889) (Sem. 1) 30-.
- Manometric method. *Recknagel, G. A.* Ps. C. 2 (1877) 291-.
- Permanent gases. *Meyer, V.* Berl. B. 13 (1880) 2019-.
- Pitch of pipes, measurements by. *Jahoda, R.* Wien Ak. Sb. 108 (1899) (Ab. 2a) 803-.
- Pressure of column of gas, apparatus for density of gases by measurement of. *Edelmann, M. T.* Carl Rpm. 17 (1881) 261-.
- Simple gases. *Zenneck, L. H.* Baumgartner Z. 3 (1835) 145-.

DENSITY OF LIQUIDS.

- Ramsden, J. A. C. 13 (1792) 243-.
- Strecker, Alex. (viii) Rpm. Phm. 25 (1827) 422-.
- Fournes, G. Phm. J. 2 (1843) 652-.
- Reischauer, C. [G.], & Vogel, A. Münch. Gelehrte Az. 44 (1857) 436-.
- Tate, T. Ph. Mg. 17 (1859) 254-.
- Sigl, J. Rpm. Phm. 6 (1869) 234-.
- Sprengel, H. A. Ps. C. 150 (1873) 459-.
- Wright, C. R. A. S. C. In. J. 11 (1892) 297-.
- Zaloziecki, R. Z. Angew. C. (1896) 552-.
- Alcoholic solutions, Tralles's investigations. Windisch, K. Berl. Gsndhamt. Arb. 9 (1894) 1-.
- Alcoholometer, Atkins's. Fletcher, J. Nicholson J. 2 (1802) 276-.
- Alcoholometers. Knoblauch, H. Halle Sb. Nf. Gs. (1859) 8-.
- Jacobi, H. St. Pét. Ac. Sc. Bll. 7 (1864) 320-.
- Müller, J. A. Par. S. C. Bll. 7 (1892) 492-.
- , Atkins's system. Jacobi, H. St. Pét. Ac. Sc. Bll. 7 (1864) 438-.
- , tables for. Tralles, J. G. Gilbert A. 38 (1811) 349-.
- Apparatus. Amat, L. Par. S. C. Bll. 45 (1886) 482-.
- Weber, L. Bresl. Schl. Gs. Jbr. (1888) 83-.
- for liquids at temperatures other than atmospheric. Hannay, J. B. C. S. J. 12 (1874) 203-.
- , new. Zambelli, L. [1888] Ven. I. At. (1888-89) 147-.
- , Salomon, W. N. Jb. Mn. (1891) (Bd. 2) 214-.
- , Lefebvre, M. Brux. S. Sc. A. 20 (1896) (Pt. 1) 108-.
- Areometric glasses, Wackenroder's, experiments with. Schrön, H. L. F. (xii) Arch. Phm. 79 (1842) 269-; 81 (1842) 124-.
- standard, necessity of common. Rubrom, M. Baumgartner Z. 7 (1840) 21-.
- Bareoscope for beet juice. Frič, J. Z. Zuckin. Böhm. 17 (1892-93) 98-.
- Blood, new method for. Haycraft, J. B. [1891] Edinb. R. S. P. 18 (1892) 251-.
- Closed space, liquid in. Stamkart, F. J. Amst. Vs. Ak. 5 (1871) (Ntk.) 175-; Arch. Néerl. 6 (1871) 217-.
- Densimeter, form. Chistoni, C. Mil. I. Lomb. Rd. 12 (1879) 318-.
- , Geissler's. Lefebvre, M. Czlg. Opt. 18 (1897) 174-.
- of liquid columns. Bertin, A. Erlenmeyer Z. 5 (1862) 33-; Strasb. S. H. Nt. Mm. 5 (Livre 2 & 3) (1862) 22 (bis)-.
- — — — —, Thury, — [1892] Arch. Sc. Ps. Nt. 29 (1893) 102-.
- , pneumatic. Michaelis, H. (xii) Z. Instk. 3 (1883) 268-.
- Densiscopes, differential. Zantedeschi, F. Wien SB. 19 (1856) 237-.
- Density bottle. Campanile, F. N. Cim. 5 (1897) 183-.

- Density bottle for liquids spontaneously inflammable in contact with air. Tribe, A. Ph. Mg. 46 (1873) 308-.
- — — tropical climates. Warden, C. J. H. C. N. 60 (1889) 236-.
- Determination of densities to 4 and 5 figures. Wackenroder, H. W. F. (xii) Arch. Phm. 124 (1853) 129-; 257-.
- Differential method of determination. Dittmar, W. C. N. 44 (1881) 51.
- Dilute aqueous solutions. Kohlrausch, F., & Hallwachs, W. Gött. Nr. (1893) 350-; A. Ps. C. 53 (1894) 14-, 1092.
- solutions. Kohlrausch, F. A. Ps. C. 56 (1895) 185-, 788.
- Efflux, density determined by rate of. Mohr, C. F. Pogg. A. 113 (1861) 156-.
- Glass beads, graduation, for densities of fluids. Ferguson, W. Dubl. J. Md. C. Sc. 2 (1833) 11-.
- Height of fluid columns, measurement by. Bohn, C. Exner Rpm. 22 (1886) 402-.

Hydrometers.

- Speer, W. Tilloch Ph. Mg. 14 (1802) 151-, 229-.
- Barré, J. A. J. de Ps. 57 (1803) 433-.
- Hare, R. Silliman J. 11 (1826) 115-.
- Marozeau, —. J. Phm. 16 (1830) 482-.
- Roster, G. Sperim. 26 (1870) 59-.
- Hirsch, B. (xii) Arch. Phm. 209 (1876) 107-.
- (Werner.) Hirsch, B. (xii) Arch. Phm. 211 (1877) 16-.
- Casamajor, P. C. N. 37 (1878) 241-, 267-; 38 (1878) 3-.
- Plato, —. D. Nf. Vh. (1893) (Th. 2, Hälfte 1) 23-.
- accuracy. Demichel, A. Mulhouse S. In. Bll. 70 (1900) 277-.
- accurate, for any temperature. O'Toole, (Rev.) H. Dubl. S. So. P. 8 (1893-98) 753-.
- for alcohol and brandy, proposal by Commission. Stampfer, S. Wien SB. (1849) (Ab. 2) 304-.
- and alcoholometers, modification. Wildenstein, R. Fresenius Z. 1 (1862) 162-.
- barometric. Pillet, J. As. Fr. C. R. (1885) (Pt. 2) 246-.
- Baumé's. Bordier, M. Bll. Phm. 4 (1812) 151-.
- Neumann, A. Baumgartner Z. 3 (1835) 372-.
- Pemberton, H. Am. J. Phm. 18 (1852) 1-.
- Baudin, —. C. R. 68 (1869) 932-.
- Coulier, —. Mm. Md. Mil. 23 (1869) 368-.
- Chandler, C. F. Wash. Nat. Ac. Mm. 3 (Pt. 1) (1885) 63-.
- , for calculating quantity of sugar in solutions. Trevisan, L. G. Dingler 70 (1838) 36-; 74 (1839) 421-.
- , comparison of scale with density. Wigner, G. W. Anal. 5 (1880) 138-.
- , verification. Almeida, J. C. d', Berthelot, —, & Coulier, —. J. Phm. 18 (1873) 257-; C. R. 77 (1873) 970-.
- Beck's. Zenneck, L. H. Baumgartner Z. 2 (1833) 244-.

Beck's, use instead of hydrostatic balance for liquids, theory to be applied in. *Trautwein, J. B.* Lieb. A. 25 (1838) 337-.

comparison of densities by various. *Gerlach, G. T.* Dingler 198 (1870) 313-.

constant volume. *Ruau, L. C. R.* 45 (1857) 442-.

construction and uses, with tables. *San Martino, G. B. da.* Verona Mm. S. It. 7 (1794) 79-.

and their correction. *Weinstein, B.* Z. Ps. C. 7 (1891) 71-.

correction and forms. *Guglielmo, G.* Rm. R. Ac. Linc. Rd. 8 (1899) (Sem. 2) 341-; 9 (1900) (Sem. 1) 9-.

— for temperature variation. *Casamajor, P.* Mon. Sc. 19 (1877) 862-.

of corvette "Witjaz," investigations with. *Makarov, S. O.* Rs. Ps.-C. S. J. 23 (Ps.) (1891) 324-; J. de Ps. 1 (1892) 400-.

for densities to '0001. *Planičvá, J. N.* Baumgartner Z. 2 (1833) 41-.

— which slightly exceed that of water. *Fellenberg, L. R. von.* [1858] Bern Mt. (1859) 1-.

Derham's. *Anon.* Nt. 37 (1888) 497-.

Dicas's Liverpool. *Pile, W. H.* Am. Phm. As. P. 9 (1860) 216-.

differential. *Fuchs, P.* Z. Angew. C. (1898) 505-.

—, of Fuchs. *Domke, —.* Z. Angew. C. (1899) 370-.

Fahrenheit's, modification. *Niemann, J. H.* Lieb. A. 2 (1832) 357-.

—, —; and new form of balance. *Guglielmo, G.* Rm. R. Ac. Linc. Rd. 4 (1895) (Sem. 1) 77-; Rv. Sc.-Ind. 27 (1895) 205-; 28 (1896) 70-.

form (*drijfbalans*). *Harting, P.* Utr. Aant. Prv. Gn. (1849) 6-.

glass, simple method of graduating. *Moore, C.* Thomson A. Ph. 11 (1826) 261-.

graduation, new method. *Pouillet, C. S. M.* J. Phm. 36 (1859) 40-; C. R. 56 (1863) 888-.

Imperial Normal-Standard Commission on. *Kaiserl. Normal-Aichungs-Commission.* Z. Angew. C. (1890) 382-.

improvements. *Arnim, L. A. von.* Gilbert A. 1 (1799) 412-.

— *Meissner, P. T.* Trommsdorff J. Phm. 22 (1813) 3-.

inaccuracy. *Roster, G.* Sperim. 25 (1870) 265-.

influence of capillarity. *Langberg, C.* (viii) Ps. Mdd. (1858) 1-; (iii) Pogg. A. 106 (1859) 299-.

— —. *Jacobi, H.* [1871] St. Pet. Ac. Sc. Mm. (Rs.) 20 (*1872) (App. No. 4) 97 pp.; St. Pet. Ac. Sc. Mm. 17 (1872) (No. 5) 70 pp.

— —. *Duclaux, E.* J. de Ps. 1 (1872) 197-.

— —. *Coulier, —.* J. Phm. 23 (1876) 175-.

— —. *Mensbrugge, G. van der.* Brux. Ac. Bll. 16 (1888) 31-.

— — and pressure of air. *Stamkart, F. J.* Amst. Vs. Ak. 1 (1866) (Ntk.) 320-; Arch. Néerl. 1 (1866) 355-.

influence of dirt on surface. *Marangoni, C.* (xii) Rv. Sc.-Ind. 12 (1880) 55-.

international. *Spence, F. C. N.* 55 (1887) 240-.

invisible. *Parragh, G.* Term. Közl. 21 (1889) 121; Fsch. Ps. (1889) (Ab. 1) 339.

manufacture. *Körner, F.* Erdm. J. Tech. C. 5 (1829) 331-.

modification. *Foord, G.* [1871] Vict. R. S. T. 10 (1874) 113-.

modulus. *Waller, E., & Hathaway, N.* Sch. Mines Q. N. Y. 6 (1885) 153-.

new. *Richter, J. B.* Berl. Gs. Nt. Fr. N. Schr. 3 (1801) 329-.

— *Lavigne, —.* Mnt. Rec. Bll. 4 (1811) 199-.

— *Alexander, —.* Pogg. A. 70 (1847) 137-.

— *Sedlaczek, J. A.* Ps. C. 158 (1876) 650-.

— *Dahm, G.* Dingler 228 (1878) 235-.

— *Handl, A.* Wien Ak. Sb. 92 (1886) (Ab. 2) 433-; 101 (1892) (Ab. 2a) 896-.

— *Láska, W.* Z. Instk. 9 (1889) 176.

— (modification of Láska's). *Aubel, E. van.* Par. S. Ps. S6. (1893) 235-.

— *Lezé, R.* Rv. Sc. 52 (1893) 220-.

— *Lohnstein, T.* Z. Instk. 14 (1894) 164-.

— *Vandevyver, L. N.* Arch. Sc. Ps. Nt. 34 (1895) 409-.

— *Sandruci, A.* N. Cim. 6 (1897) 25-.

normal. *Baumhauer, E. H. von.* Pogg. A. 113 (1861) 639-; Arch. Néerl. 1 (1866) 338-.

origin. *Salverte, E. A. C.* 27 (1798) 113-.

reading. *Marangoni, C.* Rm. R. Ac. Linc. Rd. 5 (1889) (Sem. 1) 657-.

scale. *Witz, G.* As. Fr. C. R. (1884) (Pt. 2) 132-.

—, arbitrary. *Piccini, A.* (xii) Rv. Sc.-Ind. 6 (1874) 249-.

— of equal divisions. *Gerlach, G. T.* Fresenius Z. 5 (1866) 185-.

with 2 scales. *Planičvá, J. N.* Baumgartner Z. 2 (1833) 38-.

scales. *Rauter, G.* Z. Angew. C. (1897) 215-.

—, adoption of uniform and invariable. *Witz, G.* As. Fr. C. R. (1883) 355-.

—, comparison. *Müller, (Dr.) J.* Lieb. A. 31 (1839) 81-.

— —. *Gerlach, G. T.* Fresenius Z. 4 (1865) 1-.

—, construction and testing. *Schrön, H. L. F.* (xii) Arch. Phm. 83 (1843) 1-.

— for densities of liquids and volume of the kilogramme. *Jeannel, J.* Bordeaux J. Md. 4 (1859) 31-.

—, graduation, new mode. *Ricard, —.* Caen Tr. (1811) 124-.

— —. —. *Smith, D. B.* [1825] Philad. Coll. Phm. J. 2 (1831) 9-.

—, — and testing. *Neumann, A.* Baumgartner Z. 5. (1837) 76-.

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— —. *Thoulet, J.* Rv. Mar. et Col. 124 (1895) 696-.

— —, table for reduction of observations. *Tittmann, O. H.* U. S. Coast Geod. Sv. Bll. No. 18 (1890) 175-.

- siphon-, to find temperature of water at maximum density. *Meikle, H.* Tilloch Ph. Mg. 68 (1826) 166-.
- , improved. *Meikle, H.* Ph. Mg. 4 (1828) 258-.
- siphon used as. *Meikle, H.* Edinb. N. Ph. J. 2 (1827) 366-.
- sources of error in using. *Fock, A.* Z. Ps. C. 2 (1888) 296-.
- standard. *Göckel, H.* Z. Angew. C. (1899) 712-.
- and stereometers. *Hachette, J. N. P.* A. C. 24 (1797) 333-.
- with temperature correction scale. *Fuchs, P.* Z. Angew. C. (1899) 15-.
- total immersion (Pisati system). *Reggiani, N.* Rm. R. Ac. Linc. Rd. 6 (1890) (Sem. 1) 99-.
- , *Warrington, A. W.* B. A. Rp. (1898) 791; Ph. Mg. 48 (1899) 498-.
- , variable inclination and reflection hydrometers. *Guglielmo, G.* Rm. R. Ac. Linc. Rd. 9 (1900) (Sem. 1) 33-, 71-.
- Twaddle's. *Dingler, E. M.* Dingler 67 (1838) 147-.
- universal. *Lanier, —.* Bil. Phm. 4 (1812) 307-.
- use. *Malj, F.* Z. Instk. 12 (1892) 61-.
- for variable volume and constant weight. *Libert, —.* Finist. S. Sc. Bil. 6 (Fasc. 2) (1884) 50-.
- Hydrometric measurements in glass vessels, temperature correction tables. *Fuchs, P.* Z. Angew. C. (1898) 745-, 909-.
- Hydrometry. *Hassenfratz, J. H.* A. C. 26 (1798) 3-, 132-, 188-; 27 (1798) 118-; 28 (1798) 3-; 33 (1799) 3-.
- (*Hassenfratz*). *Schmidt, G. G.* Gilbert A. 4 (1800) 194-.
- , *Descroizilles, —.* [1804] A. C. 58 (1806) 237-.
- , *Bellani, A.* Mil. G. S. Inc. 1 (1808) 229-.
- , *Delezenne, —.* Lille Tr. (1819-22) 48-.
- , *Nobile, A.* [1829] Nap. At. I. Inc. 5 (1834) 79-.
- , *Göckel, H.* Z. Angew. C. (1898) 867-.
- and the centigrade hydrometer. *Franeœur, L. B.* C. R. 14 (1842) 328-; Par. Bil. S. Encour. 41 (1842) 181-.
- , formulæ of Tadini and Eytelwein. *Franchini, P.* (vii) Bb. It. 5 (1842) 73-.
- , graphic representation in. *Meinecke, J. L. G.* (viii) Rpm. Phm. 5 (1819) 175-.
- , sliding rod in. *Hare, R.* Tilloch Ph. Mg. 67 (1826) 266-.
- Instrument for density determinations. *Ham, F.* C. Gz. 2 (1844) 125-.
- Liquid and gaseous carbon dioxide. *Heen, P. de.* Brux. Ac. Bil. 31 (1896) 379-.
- metals, density and thermal expansion of certain. *Vicentini, G., & Omodei, D.* [1887] Tor. Ac. Sc. At. 23 (1887-88) 38-.
- methane, oxygen and nitrogen. *Olsewski, K.* Krk. Ak. (Mt.-Prz.) Rz. 14 (1886) 181-, 197-; A. Ps. C. 31 (1887) 58-.

- Liquids and bodies lighter than water. *Hockin, C., & Matthiessen, A.* Lb. 1 (1867) 189-.
- at their boiling points. *Schiff, R.* Berl. B. 14 (1881) 2761-.
- higher temperatures. *Schiff, R.* Berl. B. 18 (1885) 1538-.
- Litrameter. *Hare, R.* (vi Add.) Ph. Mg. 4 (1828) 187-.
- Manometer, densities by. *Schiff, H.* Lieb. A. 121 (1862) 82-.
- Mercury, density at 0° C. *Volkman, P.* A. Ps. C. 13 (1881) 209-.
- , — in relation to barometric pressure. *Marek, W. J.* Par. Poids et Mes. Tr. Mm. 2 (*1883) D. 18-.
- Method, new. *Cagnassi, M.* (xii) Rv. Sc.-Ind. 11 (1879) 169-.
- , *Sommerkorn, H.* Berl. B. 13 (1880) 143-.
- , *Sandrucci, A.* Rv. Sc.-Ind. 19 (1887) 65-.
- Oils. *Dudley, C. B., & Pease, F. N.* Am. Eng. & Railroad J. 69 (1895) 449-.
- Pyknometer. *Boot, J. C.* C. Ztg. 20 (1896) 616-.
- , glass, with constant volume and precision adjustment. *Fuchs, P.* Z. Angew. C. (1898) 359-.
- , improved. *Voeller, F.* Z. Angew. C. (1891) 401-.
- , *Squibb, E. R.* Am. C. S. J. 19 (1897) 111-.
- for light liquids. *Göckel, H.* Z. Angew. C. (1899) 1194-.
- measurements, temperature correction tables. *Fuchs, P.* Z. Angew. C. (1899) 25-.
- , small variation in. *Wiedemann, E. E. G.* A. Ps. C. 17 (1882) 963-.
- , Sprengel's, modification. *Minozzi, A.* Rm. R. Ac. Linc. Rd. 8 (1899) (Sem. 1) 450-.
- , Wiedemann's, modification. *Schulze, R.* A. Ps. C. 28 (1886) 144-.
- Refraction of light, instrument for measuring by. *Mojon, G.* Genova Mm. S. Md. 1 (1802) 49-.
- Salinometer for measuring density of brine in marine steam boilers. *Russell, J. S.* Edinb. N. Ph. J. 34 (1843) 278-.
- Sea water. *Buchanan, J. Y.* R. S. P. 23 (1875) 801-.
- , *Makarov, S. O.* Rs. Ps.-C. S. J. 23 (Ps.) (1891) 30-; Nt. 44 (1891) 359-.
- , *Anderson, W. S.* Sc. Gg. Mg. 10 (1894) 574-, 646-.
- Variation of density produced by surface pressure in a liquid. *Monti, V.* Tor. Ac. Sc. At. 31 (1895) 150- or 194-.
- Viscous and frothy liquids. *Genieser, A.* Z. Angew. C. (1890) 44-.
- substances. *Brühl, J. W.* Berl. B. 24 (1891) 182-, 2455-.
- , *Scheibler, C.* Berl. B. 24 (1891) 357-.
- Volumenometer, double, for liquids. *Marangoni, C.* N. Cim. 20 (1886) 112-; 6 (1897) 407-.
- Water. *Stampfer, S.* Wien Jb. Pol. I. 16 (1830) 1-.
- , pure, volume and density. *Broch, O. J.* Par. Poids et Mes. Tr. Mm. 1 (*1881) A. 59-.

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- Tralles, J. G.* Gilbert A. 27 (1807) 261-.
- Raw, A.* Ac. Cms. Leop. N. Acta 9 (1818) 325-.
- Osann, G.* Pogg. A. 73 (1848) 605-.
- Laroque, F.* Toul. Mm. Ac. 6 (1850) 152-.
- Raimondì, A.* Pogg. A. 99 (1856) 639-.
- Dobbie, J. J., & Hutcheson, J. B.* Glasg. Ph. S. P. 15 (1884) 82-.
- Kleinstück, O.* Arch. Phm. 226 (1888) 166-; C. Ztg. 14 (1890) 233-.
- Leick, W.* N.-Vorp. Mt. 27 (1896) 96-.
- Negreanu, D.* Bucarest Ac. Rom. A. 22 (Pt. admin.) (1900) 72-.
- Absolute and specific weight of bodies in liquid.
- Mohr, C. F.* Pogg. A. 112 (1861) 420-.
- — — — — precipitates in liquids. *Fleck, H.* Pogg. A. 113 (1861) 160-.
- — — — — (Fleck's method).
- Mohr, C. F.* Pogg. A. 113 (1861) 655-.
- — — — — *Kahl, E.* Schlömilch Z. 7 (1862) 456-.
- Adhesion, determinations affected by. *Tünnermann, J.* Trommsdorff N. J. Phm. 26 (1833) (St. 2) 93-.
- Alloys. *Matthiessen, A.* C. S. J. 5 (1867) 201-.
- Apparatus. *Eckfeldt, J. R., & Dubois, W. E.* Silliman J. 22 (1856) 294-.
- *Fulton, H. B.* S. C. In. J. 11 (1892) 305-.
- , portable. *Richards, J. W.* Berg-Hm. Ztg. 58 (1899) 327-.
- for rapid determination. *Brown, M. W.* N. Eng. I. Mn. E. T. 36 (1887) 95-.
- Arabian determinations. *Wiedemann, E. E. G.* A. Ps. C. 20 (1883) 539-.
- Areometer, new (volumenometer). *Say, H.* A. C. 23 (1797) 1-.
- *Say's. Arnim, L. A. von.* Gilbert A. 2 (1799) 238-.
- , —, improvement. *Miller, W. H.* Ph. Mg. 5 (1834) 203.
- Barley and Scotch bigg, new instrument for. *Keith, G. S.* Edinb. Ph. J. 5 (1821) 173-.
- Cement. *Piens, C.* Brux. A. Tr. Pbl. 3 (1898) 453-.
- Correction. *Osann, G.* Kastner Arch. C. 2 (1830) 58-, 271-.
- , error in certain. *Mach, E.* Carl Rpm. 7 (1871) 377.
- Crystals. *Berkeley, (Earl of).* B. A. Rp. (1898) 837-.
- Decomposable bodies. *Christomanos, A. C.* Berl. B. 10 (1877) 782-.
- Density bottle, measurement by. *Jenzsch, G.* Pogg. A. 99 (1856) 151-.
- for powders. *Louis, H.* S. C. In. J. 13 (1894) 322-.
- Flotation, determination of densities by. *Schaffgotsch, F. von.* Pogg. A. 116 (1862) 279-.
- Gold coinage. *Broch, O. J.* N. Mg. Ntvd. 21 (1876) 363-.
- in gold-silver alloys. *Louis, H.* [1893] Am. I. Mn. E. T. 22 (1894) 117-, 724-, 775.
- Gravimeter, new, for weight and density of solids. *Bustamante, J. M.* Edinb. J. Sc. 10 (1829) 207-.
- Hydrometer, differential, for powders. *Fuchs, P. Z.* Angew. C. (1898) 623-.
- , Nicholson's, improved. *Briffandon, —.* Lyon A. S. L. (1836) 15 pp.
- for solids. *Baumgartner, A. von.* Baumgartner Z. 1 (1826) 5-.
- — — *Buignet, —.* J. de Ps. 9 (1880) 93-.
- — — *Munroe, C. E.* Smiths. Misc. Col. 33 (1888) Art. 1, 26- (Wash. Ph. S. Bil. 6 (1884).)
- — —, new form. *Failyer, G. H.* Kan. Ac. Sc. T. 11 (1889) 104.
- Ice. *Osann, G.* Kastner Arch. C. 1 (1830) 95-.
- , 0° to -20° C. *Brunner von Wattenwyll, C.* A. C. 14 (1845) 369-.
- *Dufour, L.* Bb. Un. Arch. 8 (1860) 89-; 14 (1862) 5-.
- *Nichols, E. L.* Ps. Rv. 8 (1899) 21-.
- Insoluble substances. *Symons, W. H.* Phm. J. 19 (1889) 205-.
- Instrument for densities. *Dunnington, F. P.* C. N. 41 (1880) 154-.
- and weights. *Fox, R. W.* Cornwall Pol. S. Rp. (1847) 19-.
- — —, without weights or calculation. *Adie, A.* Edinb. Mm. Wern. S. 3 (1817-20) 495-.
- , new, for solids, by measuring water displaced. *Baddeley, (Lt.).* Silliman J. 18 (1830) 263-.
- Masonry. *Reuss, G.* As. Fr. C. R. (1897) (Pt. 1) 184-.
- Method, new. *Lévy, A.* Quetelet Cor. Mth. 6 (1830) 208-.
- , — *Persoz, J.* Par. A. Cons. 5 (1864) 532-; C. R. 60 (1865) 405.
- , — *Sonstadt, E.* C. N. 29 (1874) 127-.
- , rapid. *Lezé, R.* Gén. Civ. 4 (1883-84) 181.
- Minerals. *V., O.* Berg-Hm. Ztg. 48 (1889) 35-, 50-.
- , apparatus for minute fragments. *La Touche, T. D.* Nt. 53 (1895-96) 199.
- , —, new. *Pisani, F.* C. R. 86 (1878) 350-.
- Minute solids, density and mass. *Guglielmo, G.* Rm. R. Ac. Linc. Rd. 9 (1900) (Sem. 2) 261-.
- Organic solids. *Schröder, H.* Berl. B. 12 (1879) 561-, 1611-; 13 (1880) 1070-.
- Porous and friable substances. *Parize, [P.]* (xii) Finist. S. Sc. Bll. 4 (Fasc. 2) (1882) 45-; J. de Ps. 5 (1886) 222-.
- substances. *Reszow, N. A.* Fschr. Ps. (1889) (Ab. 1) 66.
- — —, determination of density by enclosing in wax. *Aschauer, J. V.* Baumgartner Z. 4 (1837) 176-.
- Possible errors in determination. *Pierre, V.* (xii) Lotos 16 (1866) 22-.
- Powders. *Rüdorf, F.* Berl. B. 12 (1879) 249-.
- *Smeeth, W. F.* [1888] Dubl. S. Sc. P. 6 (1888-90) 61-.
- *Lenoble, E.* A. C. Anal. 3 (1898) 361-; 4 (1899) 44-.
- *Vandevyver, —.* A. C. Anal. 4 (1899) 2-.
- , apparatus for. *Leslie, J.* QJ. Sc. 21 (1826) 374-.
- — — *Bremer, G. I. W.* Rec. Tr. C. P.-Bas 17 (1898) 263-, 404-.

- Powders, heavy, small quantities. *Joly, J.*
 Dubl. S. Sc. P. 5 (1886-87) 41-.
- Pyknometer. *Berkeley, (Earl of).* [1895]
 Mn. Mg. 11 (1897) 64-.
- , modification. *Gintl, W. F. Fresenius Z.*
 8 (1869) 122-.
- , —. *Kahlbaum, G. W. A. A. Ps. C. 19*
 (1883) 378-.
- , physico-chemical. *Arpago, R. Rv. Sc.-*
 Ind. 25 (1893) 126-.
- PyknoSCOPE. *Zenneck, L. H. Kastner Arch.*
 Ntl. 14 (1828) 81-.
- Salts soluble in water. *Andreas, J. L. J. Pr.*
 C. 30 (1884) 312-.
- , —. *Retgers, J. W. Z. Ps. C. 3*
 (1889) 289-; 4 (1889) 189-; 11 (1893) 328-.
- Seeds. *Wolffenstein, O. (xii) J. Lndw. 23*
 (1875) 401-.
- Soluble substances. *Del Lupo, M. (xii) Rv.*
 Sc.-Ind. 13 (1881) 161-.
- , —, new method for. *Zehnder, L. A. Ps.*
 C. 29 (1886) 249-.
- Sprengel's apparatus, modification. *Sollas, —.*
 Dubl. S. Sc. P. 5 (1886-87) 623-.
- Spring balance, densities by. *Creighton, H.*
 Q. J. Sc. 13 (1822) 257-.
- Substances with large pores. *Guyton de Mor-*
veau, L. B. A. C. 60 (1806) 121-.
- Volumenometer. *See* Areometer (Say).
- Volumenometer. *Kopp, H. A. C. 6 (1842) 380-.*
- , —. *Raikow, P. C. Ztg. 12 (1888) 525.*
- , —. *Muraközy, K. [1890] Föl. Közl. 21*
 (1891) 117-, 148-.
- , modified, application. *Kalecsinszky, S.*
 [1890] Föl. Közl. 21 (1891) 109-, 142-.
- , new. *Tschaplovitz [Chaplovits], F. Fre-*
senius Z. 18 (1879) 440-.
- , —. *Paalow, C. A. A. Ps. C. 13 (1881)*
 332-; 14 (1881) 176-.
- , —. *Muraközy, K. Termt. Közl. 25 (1893)*
(Suppl.) 33-.
- , —. *Myers, J. E. [1893] L. Ps. S. P.*
 12 (1894) 372-; Ph. Mg. 36 (1893) 195-.
- , —. *Oberbeck, A. A. Ps. C. 67 (1899) 209-.*
- , for powders. *Schumann, C. C. Ztg. 8 (1884)*
 1778-.
- , simple form. *Linebarger, C. E. Am. C.*
 S. J. 21 (1899) 435-.
- and weighing apparatus, description.
Ångström, K. Stockh. Öfv. (1895) 643-;
Fschr. Ps. (1895) (Ab. 1) 24-.
- Volumenometers, new. *Baumhauer, E. H. von.*
 Arch. Néerl. 3 (1868) 335-.
- Wood. *Anon. (vi 1239) Tilloch Ph. Mg.*
 57 (1821) 366-.
- Yttrium, zirconium and erbium. *Meyer, S.*
 Wien Ak. Sb. 108 (1899) (Ab. 2a) 767-; Mh.
 C. (1899) 793-.

- Densimeter for solids and liquids. *Courtonne,*
H. J. de Ps. 5 (1896) 315-.
- — — — —, new. *Pâquet, E. Par. S.*
 C. Bll. 24 (1875) 51-.
- — — — —, —. *Machado, V. Lisb. J. Sc.*
 Mth. 6 (1878) 285-.
- Formula for density. *Almeida, C. A. M. de.*
 [1879] Lisb. J. Sc. Mth. 7 (1880) 20-.
- Gravimeter for solids and liquids. *Guyton de*
Morveau, L. B. Nicholson J. 1 (1797) 110-.
- Hydrometer for solids and liquids. *Atkins, G.*
 Tilloch Ph. Mg. 31 (1808) 254-.
- — — — —, —. *Bievliet, — van. Brux. S.*
 So. A. 14 (1890) (Pt. 1) 60-.
- Hydrostatic weighings. *Lummer, O. Berl.*
 Ps. Gs. Vh. (1887) 65 (bis)-.
- , capillary influence. *Macé de Lépinay, J.*
 J. de Ps. 5 (1896) 266-.
- , difficulty. *Macé de Lépinay, J. J. de*
 Ps. 5 (1896) 416-.
- Ice and sea-water, density and volumes. *Ashe,*
W. A. Science 10 (1887) 24.
- Instrument, new. *Nicholson, W. [1785]*
 Manch. Ph. S. Mm. 2 (1789) 386-.
- Method of determination. *Gentile, —. J.*
 Phm. 5 (1867) 401-.
- Pendulum, application. *Serra-Carpi, G. C. R.*
 64 (1867) 659-.
- Pyknometer for volume and density of solids
 and liquids. *Bensemann, R. Rpm. Anal. C.*
 7 (1887) 19-.
- Volumenometer for solids and liquids. *Kopp,*
 H. Lieb. A. 35 (1840) 17-.

VAPOUR DENSITIES.

- Couerbe, J. P. Bordeaux Act. (1840) 5-.*
- Sainte-Claire Deville, [É.] H. C. R. 56 (1863)*
 729-.
- Pfaundler, L. Innsb. Nt. Md. B. 1 (1870) 40-.*
- Croullebois, M. C. R. 78 (1874) 496-.*
- (Croullebois.) Sainte-Claire Deville, É. H.*
C. R. 78 (1874) 534-.
- (Saint-Claire Deville.) Croullebois, M. C. R.*
 78 (1874) 805-.
- Brühl, J. W. Berl. B. 9 (1876) 1368-.*
- Hautefeuille, —, & Troost, —. C. R. 83 (1876)*
 220-.
- Ciamician, G. L., & Goldschmiedt, G. Wien*
 Ak. Sb. 75 (1877) (Ab. 2) 431-.
- Meyer, V. Berl. B. 10 (1877) 2068-; 11 (1878)*
 1867-.
- Sainte-Claire Deville, É. H. C. R. 84 (1877)*
 1256-.
- (Sainte-Claire Deville.) Wurtz, C. A. C. R.*
 84 (1877) 1347-.
- Hofmann, A. W. Berl. B. 11 (1878) 1684-.*
- Troost, L. J. C. R. 86 (1878) 331-, 1394-.*
- Piccard, J. Berl. B. 13 (1880) 1079-.*
- Dewar, J., & Scott, A. B. A. Bp. (1881) 597.*
- Meyer, V. Berl. B. 15 (1882) 2775-.*
- Pawlewski, B. (xii) Kosmos (Lw.) 8 (1883)*
 93-; (x) Berl. B. 16 (1883) 1293-.
- Meyer, V. Berl. B. 19 (1886) 1861-.*
- Nilson, L. F., & Pettersson, O. A. C. 9 (1886) 554-.*
- Schall, C. Berl. B. 20 (1887) 1435-, 1759-;*
 21 (1888) 100-.
- Bott, W. C. S. P. 4 (1888) 110.*

DENSITY OF SOLIDS AND LIQUIDS.

- Hare, R. Silliman J. 11 (1826) 121-.*
- Apparatus. *Nicol, W. W. J. C. N. 47 (1883)*
 85-.
- , —. *Raikow, P., & Prodanow, N. C. Ztg. 10*
 (1886) 1556.
- Areopyknometer with arbitrary scale. *Piccini,*
 A. (xii) Rv. Sc.-Ind. 11 (1879) 14-.

- Richards, T. W. C. N. 59 (1889) 87-.
- Krause, A., & Meyer, V. Z. Ps. C. 6 (1890) 5-.
- Schall, C. Berl. B. 23 (1890) 919-, 1701-.
- Lunge, G., & Neuberg, O. Berl. B. 24 (1891) 729-.
- Schall, C. J. Pr. C. 50 (1894) 87-.
- Winkler, L. W. C. Ztg. 23 (1899) 627.
- acoustic method. Goldschmidt, H. Berl. B. 13 (1880) 768-.
- apparatus. Grabowski, A. A. C. Phm. 138 (1866) 174-.
- (in barometric vacuum). Hofmann, A. W. D. C. Gs. B. 1 (1868) 198-; 9 (1876) 1304-.
- , Bott, W., & Macnair, D. S. Berl. B. 20 (1887) 916-, 1617.
- , Dyson, G. C. N. 55 (1887) 88.
- , Macnair, D. S. C. N. 55 (1887) 289.
- , Harker, J. A. C. N. 62 (1890) 180.
- for determination by Gay-Lussac's method. Warren, C. M. [1866] Am. Ac. P. 7 (1868) 99-.
- , Grabowski's, modification. Pfaundler, L. D. C. Gs. B. 5 (1872) 575-.
- , Hofmann's, modification. Wichelhaus, H. D. C. Gs. B. 3 (1870) 166-.
- , —, Engler, C. Berl. B. 9 (1876) 1419-.
- , —, Muir, M. M. P., & Suguira, S. C. S. J. (1877) (2) 140-.
- , —, trough for. Easterfield, T. H. C. N. 60 (1889) 250-.
- in barometric vacuum. Brühl, J. W. Berl. B. 12 (1879) 197-.
- Dulong's method. Dumas, J. B. C. R. 78 (1874) 536-.
- Dumas's method, improved modification. Habermann, J. [1876] Wien Ak. Sb. 74 (1877) (Ab. 2) 423-.
- by gaseous displacement under varying pressure. Meunier, J. C. R. 98 (1884) 1268-.
- in glass vessels at boiling-point of selenium. Troost, L. J. C. R. 95 (1882) 30-.
- at high temperatures. Meyer, V., & Recklinghausen, M. von. Berl. B. 30 (1897) 1926-.
- , —, of substances which attack mercury. Pfaundler, L. Berl. B. 12 (1879) 165-.
- history. Hofmann, A. W. Berl. B. 10 (1877) 962-.
- , Brown, J. T. B. A. Rp. (1879) 304-.
- Hofmann's method. Gabba, L. Mil. I. Lomb. Rd. 2 (1869) 50-.
- , Tilden, W. A. C. N. 37 (1878) 219.
- influence of shape of bulb. Biltz, H. Berl. B. 21 (1888) 2772-.
- of inorganic substances. Meyer, C., & Meyer, V. Berl. B. 12 (1879) 609-, 1282-.
- , —, at very high temperatures. Meyer, C., & Meyer, V. Berl. B. 12 (1879) 1112-.
- at low temperatures, V. Meyer's method, modification. Perrenoud, P. Lieb. A. 187 (1877) 77-.
- V. Meyer's method. Smith, Watson. C. N. 39 (1879) 66-.
- , —, Williams, C. G. C. N. 39 (1879) 110.
- , —, Meyer, L. Berl. B. 13 (1880) 991-.
- V. Meyer's method. Ekstrand, A. G., & Pettersson, O. Berl. B. 13 (1880) 1185-.
- , —, modified. Gudeman, E. Am. C. S. J. 12 (1890) 399.
- , —, for use under reduced pressure. Richards, T. W. C. N. 59 (1889) 89-.
- , —, possible cause of error in. Piccard, J. [1891] Laus. S. Vd. Bil. 27 (1892) 265-.
- , —, simplified. Schwarz, H. Berl. B. 16 (1883) 1051-.
- , —, (Schwarz). Meyer, V. Berl. B. 17 (1884) 1334-.
- Naumann's method. Horstmann, A. Berl. B. 11 (1878) 204-.
- of organic substances with high boiling points. Troost, L. J. C. R. 89 (1879) 351-.
- Pettersson and Ekstrand's method, modification. Schall, C. Berl. B. 18 (1885) 2068-.
- under reduced pressure. Malfatti, H., & Schoop, P. Z. Ps. C. 1 (1887) 159-.
- , —, Meyer, V. D. Nf. Tbl. (1889) 220.
- , —, Schall, C. Berl. B. 22 (1889) 140-; 23 (1890) 919-; 25 (1892) 1489-; J. Pr. C. 45 (1892) 134-; 62 (1900) 536-.
- , —, apparatus for. Eykman, J. F. Berl. B. 22 (1889) 2754-.
- , —, V. Meyer's method. Hoff, J. H. van't, & Romeny, J. (xii) Mbl. Nt. 8 (1878) 135-.
- saturated. Dupré, A. C. R. 54 (1862) 972-.
- , of liquids at different temperatures. Pérot, A. Nancy S. Sc. Bll. (1886) (Fasc. 20) xxxvii-.
- sources of error. Alexeev, W. Berl. B. 18 (1885) 2898-.
- , —, in application of law of mixtures. Hautefeuille, —, & Troost, —. C. R. 83 (1876) 975-.
- steam, influence of hygroscopic character of glass on determination. Grimaldi, G., & Macaluso, D. Rm. R. Ac. Line. T. 6 (1882) 264-.
- , —, at all temperatures, apparatus for. Fairbairn, W. Manch. Ph. S. P. 1 (1857-60) 70-.
- , —, of substances boiling above 440° and of those attacking mercury or Wood's metal. Meyer, C., & Meyer, V. Berl. B. 11 (1878) 2253-.
- , —, below their boiling points. Demuth, R., & Meyer, V. Berl. B. 23 (1890) 311-.
- , —, with high boiling points. Meyer, V. Berl. B. 9 (1876) 1216-.
- , —, —, Klobukow, N. von. A. Ps. C. 22 (1884) 493-.
- , —, —, under reduced pressure. La Coste, W. Berl. B. 18 (1885) 2122-.
- , —, —, Schall, C. Berl. B. 20 (1887) 1827-, 2127-.
- , —, low boiling points. Klobukow, N. von. A. Ps. C. 22 (1884) 465-.
- and temperature of experiment, simultaneous determination. Nilson, L. F., & Pettersson, O. Stockh. Ak. Hndl. Bh. 11 (1887) No. 6, 16 pp.
- in vapour of phosphorus pentasulphide. Knecht, W. [1879] Lieb. A. 202 (1880) 31-.
- of vapours which attack porcelain at red heat. Züblin, H., & Meyer, V. Berl. B. 12 (1879) 2204-.

of volatile liquids, at temperatures below boiling point. *Playfair, L., & Wanklyn, J. A.* Edinb. R. S. T. 22 (1861) 441-
— water. *Ward, F. O.* C. N. 16 (1867) 15-38-50-
at white heat, of elements and compounds. *Biltz, H., & Meyer, V.* Gött. Nr. (1889) 347-.

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Peale, F. Franklin I. J. 14 (1847) 59-
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accurate and convenient, new plan. *Lüdicke, M. A. F.* Gilbert A. 1 (1799) 123-
— — large. *Mendelssohn, N.* Gilbert A. 29 (1808) 153-
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— of knife edges. *Gauss, C. F.* As. Nr. 14 (1837) 241-
—, machine for. *Hasemann, H.* Z. Instk. 14 (1894) 50-
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—, —, —. *Geiger, —.* C. Ztg. 15 (1891) 476-
—, improvements. *Westphal, G.* Fresenius Z. 7 (1868) 294-
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—, auxiliary. *Law, R.* C. S. J. 69 (1896) 526-
—, improved. *Makins, G. H.* C. S. J. 6 (1854) 36-
—, improvements. *Narci, C. P. T.* J. Mines 7 (1797-98) 455-
—, recent. *Austin, L. S.* [1897] Colo. Sc. S. P. 6 (1897-1900) 34-
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— exchange of pans. *Stadthagen, H.* Z. Instk. 20 (1900) 206-
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beam, best form. *Kernot, W. C.* [1880-94] Vict. R. S. T. 17 (1881) 19-; Vict. R. S. P. 7 (1895) 141-
—, improved. *Arzberger, J.* Gilbert A. 46 (1814) 294-
—, influence of bending. *Pierre, V.* Prag Sb. (1862) 13-
—, short (Schickert's). *Hartig, T.* Dresden Sb. Isis (1871) 56-
—, —. *Sartorius, F.* C. Ztg. 9 (1885) 1299-

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—, Emery's support. *Schwirkus, G.* Z. Instk. 4 (1884) 261-
— of steel, influence of magnetism. *Studer, J. G.* Gilbert A. 13 (1803) 122-
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—, *Hase, R.* Z. Angew. C. (1898) 736-
—, effect of flexibility. *Proctor, B. S.* [1876] Newcastle C. S. T. 3 (1877) 183-
—, new; theory of construction of balances. *Cooke, I. B.* Phm. J. 1 (1860) 360-
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—, new methods. *Weber, W. E.* Gött. Cm. 8 (1832-37) (Ps.) 81-
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—, suggestions on use. *Rayleigh, (Lord).* B. A. Rp. (1883) 401-
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— — —. *Barnard, F. A. P.* Wash. Nat. Ac. Mm. 4 (Pt. 1) (1888) 203-
— — —, new. *Thore, J.* Dax S. Borda Bll. (1887) 131-
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— — —, Lux's. *Anon.* C. N. 58 (1888) 4-
— — —, new. *Lux, F.* Fresenius Z. 29 (1890) 13-
— — —, solids and liquids. *Machado, V.* [1881] Lisb. J. Sc. Mth. 8 (1882) 97-
— — — liquids. *Westphal, G.* Fresenius Z. 9 (1870) 233-
— — — minerals and other solids heavier than water. *Parish, R.* Am. J. Sc. 10 (1875) 352-
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- hydrostatic. *Buchanan, J. Y. D. C. Gs. B.* 4 (1871) 338-.
- , accurate form. *Joly, J.* [1886] *Dubl. S. Sc. P.* 5 (1886-87) 347-.
- , and adjuncts. *Sartorius, F.* *Z. Instk.* 13 (1893) 388-.
- , for densities of liquids. *Autenrieth, O.* *Dingler* 159 (1861) 109-.
- , experimental verification of principle of. *Pâquet, É. J. de Ps.* 10 (1891) 340-.
- , extremely cheap and delicate. *Ritchie, W.* *Edinb. J. Sc.* 5 (1826) 118-.
- , modifications. *Sartorius, F. C. Ztg.* 9 (1885) 1374-.
- , new. *Gerland, B. W. S. C. In. J.* 17 (1898) 13.
- , use. *Hirn, G. A. A. Gén. Civ.* 2 (1863) (pte. 2) 113-, 153-.
- Kuhlmann's. *Gerland, B. W. S. C. In. J.* 14 (1895) 551-.
- technical. *Gerland, B. W. S. C. In. J.* 12 (1893) 995-.
- limit of accuracy at present attainable. *Seidel, L. Münch. Sb.* (1867) (2) 231-.
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- mercury. *Horner, J. K. Gilbert A.* 68 (1821) 101-.
- for metallurgical purposes. *Rinman, C. (sen.) Jern-Kont. A.* 3 (1819) 106-.
- method of using with great delicacy. *Poynting, J. H.* [1878] *R. S. P.* 28 (1879) 2-.
- modification. *Mohr, C. F. Pogg. A.* 25 (1832) 266-.
- Mohr's, densities determined by. *Demichel, —. A. C. Anal.* 5 (1900) 287-.
- , modification. *Guglielmo, G. Rv. Sc.-Ind.* 26 (1894) 177-.
- , —, and apparatus for volume of solids. *Guglielmo, G. Rm. R. Ac. Linc. Rd.* 3 (1894) (*Sem.* 2) 299-.
- must-, Oechsle, reliability. *Weigelt, C. H. C. CB.* 2 (1871) 604-.
- new. *Montu, —. Par. S. Phlm. Bil.* 1 (1797) 108-.
- , *Tralles, J. G.* [1805] *Berl. Ab.* (1804-11) (*Mth.*) 65-.
- , *Joule, J. P. Manch. Lt. Ph. S. P.* 5 (1866) 145, 165.
- , *Mendelejeff, D. I. Les Mondes* 36 (1875) 335-.
- (Mendelejeff's). *Salleron, J. C. R.* 80 (1875) 378-.
- , *Jäger, H. Carl Rpm.* 13 (1877) 288-.
- , *Kruspér, I.* [1878] (*xii*) *Mag. Tud. Ak. Étk. (Mth.)* 6 (1879) (No. 6) 20 pp.; (*x*) *A. Ps. C. Beibl.* 4 (1880) 638-.
- , *Pellat, —. Par. S. Ps. Sé.* (1889) 93.
- (pondérateur). *Serrin, V. Par. S. Ps. Sé.* (1890) 106.
- arrangements for. *Bunge, P. Z. Instk.* 14 (1894) 131-.
- form. *Bunge, P. Carl Rpm.* 3 (1867) 269-.
- (Roberval). *Picart, A. C. R.* 96 (1883) 1782-; 97 (1883) 86-, 252.
- , *Phillips, H. J. C. N.* 72 (1895) 16.
- new form, and its adjustment. *Girgensohn, T. St. Pét. Ac. Sc. Bil.* 5 (1839) 177-.
- forms, Nemetz's. *Pensky, B. Z. Instk.* 12 (1892) 221-; 14 (1894) 325.
- oscillation. *Stamkart, F. J. Amst. Vh.* 1 (1849) 63-.
- , *Mendelejeff, D. R. S. P.* 63 (1898) 454-.
- and equilibrium. *Thiesen, M. Par. Poids et Mes. Tr. Mm.* 5 (1886) 40 + xxxii pp.
- period, means for reducing. *Verbeek, A. Dingler* 304 (1897) 156-.
- , theory. *Anon. Dingler* 307 (1898) 225-, 249-.
- platform. *Hoffmann, C. Pogg. A.* 64 (1845) 317-.
- , *Endlweber, J. Carl Rpm.* 15 (1879) 607-.
- of precision. *Sacré, É. Brux. Ac. Bil.* 12 (1845) 17.
- , *Arzberger, F. Brünn Vh.* 14 (1875) (*Ab.*) 157-.
- , *Redon, L. As. Fr. C. R.* (1878) 315-.
- , *Serrin, V. C. R.* 112 (1891) 1299, 1480.
- , *Leick, —. N.-Vorp. Mt.* 26 (1895) xvi.
- , adjustments and suspensions. *Sauter, A. Cztg. Opt.* 15 (1894) 232-.
- , Bunge's, theory. *Bunge, P. Cztg. Opt.* 5 (1884) 220-, 229-.
- , construction and adjustment. *Schultze, P. Z. Instk.* 12 (1892) 97-.
- , —, verification, Brauer's methods. *Lermantov, V. V. (xii) Rs. C. Ps. S. J.* 9 (*Ps.*) (1877) ([*Pt. 1*]) 326-.
- , direct reading, aperiodic. *Curie, P. C. R.* 108 (1889) 663-; *Par. S. Ps. Sé.* (1889) 218-.
- , —, —, Curie's. *Ledeboer, P. H. Lum. Élect.* 36 (1890) 161-.
- , new arrestment. *Lannoy, S. de. Z. Instk.* 17 (1897) 261-.
- , —, construction. *Kruspér, I.* [1886] *Mth. Termt. Éts.* 5 (1887) 70-; *Mth. Nt. B. Ung.* 5 (1886-87) 1-.
- , optical apparatus for rapid weighing. *Collot, A. C. R.* 112 (1891) 99-.
- , reading arrangement. *Spoerhase, W. Z. Instk.* 16 (1896) 167-.
- recent construction, description. *Bunge, P. Carl Rpm.* 16 (1880) 372-.
- reflection-. *Wartmann, É.* [1841] *Gen. Mm. S. Ps.* 11 (1846) 115-.
- , *Grassi, G. N. Cim.* 11 (1874) 195-, 217-.
- registering. *Sprung, A. Berl. Ps. Gs. Vh.* (1887) 13 (*bis*)-; *Z. Instk.* 8 (1888) 17-.
- Roman (or steel-yard). *Ferroni, P. Mod. S. It. Mm.* 17 (1815) 417-.
- (— —), ancient. *Commaillie, A. J. Phm.* 44 (1863) 490-.
- (— —), improvements by Paul. *Pictet, M. A. J. Mines* 8 (1797-98) 671-.
- (— —), micrometric. *Bourcart, R.* [1888] *Mulhouse S. In. Bil.* 59 (1889) 31-.
- (— —), modification. *Hassenfratz, J. H. J. Mines* 8 (1798) 683-.

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- Roman (or steel-yard), new, report to *Bureau Consultatif des Poids et Mesures*. *Gatthey*, —. *J. Mines* 8 (1797-98) 691-.
- (— —) and ordinary, levers used in construction and verification. *Desnanot*, —. *Auvergne A. Sc.* 26 (1853) 273-.
- (— —), theory. *Pickel*, *I.* *Münch. D.* (1814-15) 83-.
- scientific, construction and use. *Schwirkus*, *G.* *Z. Instk.* 7 (1887) 41-, 83-, 412-.
- sensitive and convenient, serving also as magnetometer. *Lampadius*, *W. A.* *Schweigger J.* 10 (1814) 171-.
- simple. *Black*, *Jos.* [1790] *Thomson A. Ph.* 10 (1825) 52-.
- substitution-. *Lohnstein*, *T.* *C. Ztg.* 20 (1896) 572-.
- sources of error. *Hennig*, *R.* *Z. Instk.* 5 (1885) 161-.
- spiral. *Cross*, *C. F.* *C. N.* 44 (1881) 101-.
- support. *Prony*, *R. de.* *A. C.* 36 (1800) 50-.
- tangential, direct reading of densities by. *Zenger*, *C. W.* [1871] *Prag Ab.* 5 (1872) 51 pp.
- temperature change in sensitiveness. *Middel*, *T. A.* *Ps.* 2 (1900) 115-.
- theory. *Rheinauer*, *J. A.* *Ps. C.* 133 (1868) 179-.
- (Rheinauer). *Müller*, *J. A.* *Ps. C.* 133 (*1868) 682-.
- (Müller). *Rheinauer*, *J. A.* *Ps. C.* 135 (1868) 335-.
- , *Sludskii*, *T. A.* (xii) *Rec. Mth.* (Moscou) 4 (1869-70) (Pt. 2) 111-.
- , *Aldis*, *W. S.* [1876] *Newcastle C. S. T.* 3 (1877) 151-, 161-.
- , *Moors*, *B. P.* *N. Arch. Wisk.* 12 (1886) 216-.
- and use. *Schönemann*, *T.* *Grunert Arch.* 24 (1855) 264-.
- vacuum, Bunge's. *Marek*, *W.* *Par. Poids et Mes. PV.* (*1881) 45-.
- , new. *Kruspér*, *S.* *Z. Instk.* 9 (1889) 81-.
- verification and correction. *L'Homme*, — *de.* *Le Puy S. Ag. A.* (1828) 174-.
- vibrationless support. *Marek*, *W.* *Z. Instk.* 9 (1889) 175-.
- and weighing. *Zech*, *P.* *Carl Rpm.* 5 (1869) 102-.
- , theory. *Thiesen*, *M. F.* (xii) *Z. Instk.* 2 (1882) 358-; 3 (1883) 81-.
- and weights. *Schwirkus*, *G.* (xii) *Z. Instk.* 1 (1881) 84-, 124; 2 (1882) 310-.
- and weights, etc. *Stas*, —. *Par. Poids et Mes. PV.* (*1875-76) 87-.

- Balances and weights, report on those used by the Commission. *Chisholm*, *H. W. A.* *Cons. Arts et Mét.* 10 (*1873) 111-.
- Coins, machine for weighing. *Séguier*, *A. C.* *R.* 31 (1850) 188-.
- Gold bullion assay, new method of weighing for. *Forod*, *G.* [1875] *Vict. R. S. T.* 12 (1876) 93-.
- Grain, instrument for measuring. (Chondrometer.) *Ovenden*, —, & *Payne*, —. *Nicholson J.* 34 (1813) 198-.
- Seale, assorter's, and weighing machine, of Madras mint. *Smith*, *J. T.* *Madras Eng. Rp.* 2 (1846) 169-.

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- Scale-beam, construction. *Dearborn*, *B.* *Bost. Mm. Am. Ac.* 3 (1809) 40-.
- Steel-yard, Aristotle's. *Cappelle*, *J. P. van.* *Amst. Ts. Nt. Wet.* (1810-11) 305-.
- Weigh-bridge. *Rose*, *W. N.* *Amst. Ts. Ws. Nt. Wet.* 1 (1848) 172-.
- , Guillaumin's. *Pr.* *Dingler* 269 (1888) 496-.
- , new. *Steinheil*, *C. A. von.* *Wien SB.* (1850) (*Ab.* 2) 398-.
- , theory. *Endlweber*, *J.* *Exner Rpm.* 21 (1885) 637-.
- , — and construction. *Mohr*, *C. F.* *Dingler* 78 (1840) 195-.
- Weighing, approximate, apparatus. *Hase*, *R.* *Cztg. Opt.* 19 (1898) 191.
- machine, compound (*basculé*), theory. *Moors*, *B. P.* *N. Arch. Wisk.* 3 (*1877) 33-, 97-.
- , Quintenz. *E....* *Crelle J.* 1 (1826) 157-.
- , — (or decimal). *Rühlmann*, —. *Dingler* 132 (1854) 255-.
- , —. *Rittershaus*, *T.* *Giving.* 21 (1875) 45-.
- , theory and description. *Schönemann*, *T.* *Wien D.* 8 (1854) (*Ab.* 2) 1-.
- machines. *Kent*, *W.* *Franklin I. J.* 126 (1888) 169-.
- , sensibility. *Schönemann*, *T.* [1852] *Wien D.* 5 (1853) 157-.
- , — (Schönemann). *Ettingshausen*, *A. von.* *Wien Sb.* 8 (1852) 442-.
- and recording machine, electrical. *McGarvey*, *E.* [1900] *Sc. Abs.* 4 (1901) 5.

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MEASUREMENT OF VELOCITY.

- Aerostat, apparatus for. *Leloup*, *J.* *Aér.* (1896) 123-.
- Apparent motions of objects. *Van Dyck*, *F. C.* (xii) *Am. Mer. J.* 3 (1882) 72-.
- Cycles. *Guérin*, *V.* *Rv. Sc.* 42 (1888) 112-.
- Difficulties in calculation. *Denny*, *W.* *Glasg. I. Eng. T.* 18 (1875) 193-.
- Electric sparks, photography by, application. *Hermite*, *G.* *C. R.* 106 (1888) 561-.
- Engineering purposes, measurement for. [*Hele*] *Shaw*, *H. S.* *I. CE. P.* 69 (1882) 364-.
- Explosive waves, chronographic measurements of velocity. *Smith*, *F. J.* *R. S. P.* 45 (1889) 451-.
- Indicating and recording apparatus, theory. *Hele Shaw*, *H. S.* [1884] *Bristol Nt. S. P.* 4 (1885) 130-.
- Indicator of velocity and distance, by resistance of air. (Velodometer.) *La Valette*, *H. de.* *Gén. Civ.* 27 (1895) 11-.
- Intermittent light, use in measuring rapid motions. *Hermite*, *G.* *C. R.* 103 (1886) 412-.
- Kinometer. *Jacquemier*, *R.* *Rv. Mar. et Col.* 58 (1878) 265-; 94 (1887) 351-.

0820 Rotation Velocity

- Pendulum, application. *Boucheporn*, —. C. R. 36 (1855) 851-.
- movements, velocity recorder in. *Lecarme, J., & Lecarme, L.* C. R. 124 (1897) 356.
- Photographic analysis of movements. *Marey*, —. J. de Ps. 3 (1884) 199-.
- methods. *Heun, K.* Z. Mth. Ps. 44 (1899) 18-.
- Pumping-engine velocity diagrams. *Baird, D.* Fed. I. Mn. E. T. 9 (1895) 138-.
- Rapid movements, especially periodic, observation. *Plateau, J. A. F.* Brux. Ac. Bll. 6 (1883) 484-.
- Recorder, new, and application to anemometry. *Griffiths, J. A.* N. S. W. R. S. J. 28 (1894) 281-.

ROTATION VELOCITY.

- Dolbear, A. E.* Am. J. Sc. 3 (1872) 248-.
- Schuller, A. A.* Ps. C. 146 (1872) 497-.
- Clarke, G. S., & McLeod, H.* R. S. P. 26 (1878) 157-.
- Jones, J. V.* Card. Nt. S. T. 20 (1889) 30.
- by centrifugal speed gauge. *Prytz, K.* Z. Instk. 11 (1891) 389-.
- counter, differential, mechanism and use. *Valessie*, —. C. R. 86 (1878) 1116-.
- , —, *Valessie's* (report). *Dupuy de Lôme*, —. C. R. 86 (1878) 1364-.
- , —, —. *Jourden, L.* [1881] Rv. Mar. et Col. 74 (1882) 55-.
- , for motors. *Gérard, A.* Brux. Ac. Bll. 47 (1879) 47-.
- of disks, etc. *Werner*, —. Berl. Pol. Gs. Vh. 22 (1861) 127-.
- indicator. *Bernardi, E.* Ven. I. At. 6 (1880) 773-.
- *Lambinet*, —. Rv. Mar. et Col. 81 (1884) 379-.
- *Samson, (le lt.) G.* Rv. Mar. et Col. 116 (1893) 39-.
- *Amster, A.* Arch. Sc. Ps. Nt. 32 (1894) 291-.
- *Tétot, V.* Rv. Mar. et Col. 128 (1896) 434-.
- , electric. *Anon.* Tel. J. 15 (1884) 469.
- , —. *Dary, G.* Sc. Abs. 1 (1898) 673.
- , —. *Browne, W. H. (jun.)* Sc. Abs. 2 (1899) 432.
- , electromagnetic. *Claude, G.* Sc. Abs. 1 (1898) 97-.
- , magnetic. *Deprez, M.* Lum. Élect. 3 (*1881) 407-.
- , pneumatic. *Rung, (Capt.) G.* Z. Instk. 6 (1886) 201-.
- for ships' screw propellers. *Campbell, (Sir) A., & Goolden, W. T.* L. Ps. S. P. 6 (1885) 147-; Ph. Mg. 18 (1884) 57-.
- — —. *Drouet, (le lt.) G.* Rv. Mar. et Col. 118 (1893) 458-.
- indicators. *Richard, G.* Lum. Élect. 15 (1885) 258-, 295-; 34 (1889) 101-.
- , new. *Richard*, —. Cg. Int. Chron. (1889) 205-.
- means of producing constant. *Webster, A. G.* Am. J. Sc. 3 (1897) 379-.
- periods. *Prytz, K.* [1890] Kjøb. Dn. Vd. Selsk. Skr. 7 (1890-94) 35-.

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- spiral goniometry in relation to. *Barus, C.* Am. J. Sc. 48 (1894) 1-.
- stroboscopic measurements. *Ettingshausen, A. von.* Carl Rpm. 12 (1876) 1-.
- tachometer. *Donkin, B.* Tilloch Ph. Mg. 38 (1811) 42-.
- *Thomas, A.* As. Fr. C. R. (1874) 154-.
- *Sartiaux, E.* Lum. Élect. 13 (1884) 340-.
- *Käß, A.* Oestr. Z. Brgw. 41 (1893) 471-.
- (*Vedovelli's*). *Thuillier, G.* Par. S. Ps. Sé. (1899) 50*.
- , differential. *Fuchs, K.* Elekttech. Z. 9 (1888) 300-.
- , electric. *Picou, R. V.* Lum. Élect. 29 (1888) 416-.
- , — hand. *Fessenden, R. A.* Sc. Abs. 3 (1900) 170-.
- , registering. *Anon.* Elekttech. Z. 7 (1886) 126-.
- testing and study. *Göpel, F.* Z. Instk. 16 (1896) 33-.
- and torsion, telephonic indicator. *Resio, C.* C. R. 94 (1882) 854-; Lum. Élect. 6 (*1882) 399-.
- variable, new system for imparting and recording. *Beaumont, M. W.* Elect. 17 (1886) 364-.
- variations, in motors. *Léauté, H.* Gén. Civ. 12 (1887-88) 163.
- , —. *Bourcart, R.* Mulhouse S. In. Bll. 63 (1893) 418-.
- , small. *Anthony, W. A.* Am. As. P. (1886) 118-.
- Running, instrument recording velocity. *Marey, E. J.* C. R. 104 (1887) 1582-.
- Seismic movement, velocity, and acceleration of wave-particle, determination, Indian observations, 1897, and formulae. *Oldham, R. D. I.* Gl. Sv. Mm. 29 (1899) 344-.

SHIPS' VELOCITY.

- Hamill, H.* Nicholson J. 14 (1806) 343-.
- Mayette, J.* Mâcon Ac. A. 6 (1888) 341-.
- currents, etc., instrument for. *Napier, J. R.* Glasg. Ph. S. P. 3 (1848-53) 350-.
- indicator. *Russell, J. S.* B. A. Rp. (1842) (pt. 2) 109.
- instrument for. *Hopkinson, F.* [1783-90] Am. Ph. S. T. 2 (1786) 159-; 3 (1793) 239-.
- *Cooke, J.* Nicholson J. 5 (1802) 48-, 265-.
- *Burney, J.* Nicholson J. 24 (1809) 57-.
- , and governor of engines. *Lambinet, E.* Rv. Mar. et Col. 95 (1887) 177-.
- , by log-line. *Newman, J.* QJ. Sc. 2 (1817) 90-.
- instruments for. *Brit. Ass. Comm.* B. A. Rp. (1879) 210-.
- *Gelcich, E.* Z. Instk. 4 (1884) 231-, 274.
- , Pressure-log experiments. *Froude, W.* B. A. Rp. (1874) 255-.
- log. *Gould, C.* Gilbert A. 8 (1801) 474-.

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- log. *Gelcich, E.* Z. Instk. 5 (1885) 394-.
- , *Baule, (le lt.) A.* Rv. Mar. et Col. 112 (1892) 374-; 120 (1894) 116-.
- and anemometer and warning compass. *Fleuriais, G.* Rv. Mar. et Col. 71 (1881) 433-.
- , correction of errors. *Keller, F. A. E.* (vi Adds.) A. Hydrog. 14 (1858) 387-.
- , electric. *Hubbard, S.* Science 8 (1886) 256-.
- , —, *Fleuriais, G.* Rv. Mar. et Col. 100 (1889) 329-.
- , —, *Le Goarant de Tromelin, (le lt.) G.* Rv. Mar. et Col. 110 (1891) 302-.
- , —, automatic. *Ricart Giralt, J.* [1893] Barcel. Ac. Bl. 1 (1892-1900) 122-.
- , —, on principle of Robinson cup anemometer. *Fleuriais, G.* Rv. Mar. et Col. 63 (1879) 465-; C. R. 96 (1883) 1633-.
- , —, —, —, *Le Goarant de Tromelin, G. C. R.* 96 (1883) 1441-.
- , —, —, *Soulages, C. C.* Lum. Élect. 14 (1884) 165-, 260-.
- , hydrostatic. *Berthon, E. L. R. S. P.* 5 (1850) 919.
- logs, electric. *Richard, G.* Lum. Élect. 21 (1886) 396-.
- , pressure-. *Napier, J. R.* [1872] Glasg. Ph. S. P. 8 (1873) 146-.
- and velocity of wind. *Pâris, (le lt.) A.* Rv. Mar. et Col. 87 (1885) 5-; 88 (1886) 78-.

- Steam-engine, piston, instrument for. *Tregaskis, R.* Cornwall Pol. S. T. (1842) 118-.
- Tables of velocities in metres per second. *Jackson, J.* Mntp. S. Lang. Gg. Bl. 11 (1888) 451-.
- Trains. *Fèvre, —.* Par. A. Pon. Chauss. 12 (1886) 345-.
- , *Haedenkamp, H.* Grunert Arch. 6 (1845) 172-.
- , *Steiner, F.* Rv. Sc.-Ind. 16 (1884) 320-.
- , *Hasler, G.* Bern Mt. (1889) vi-.
- , registering apparatus. *Desdouts, —.* A. Pon. Chauss. (1900) (Trim. 2) 168-.
- , —, electric. *Waidorp, H.* Lum. Élect. 8 (*1883) 84-.
- , —, —, *Frischen, C.* Elekttech. Z. 7 (1886) 159-.
- , tachometer for. *Deneil, —.* A. Mines 2 (1852) 217-.
- Tuning-forks, tests of variation by. *Göpel, F.* [1900] Sc. Abs. 4 (1901) 318-.

MEASUREMENT OF ACCELERATION.

- Acceleration, geometrical treatment. *Dobbs, W. J.* Mth. Gz. 1 (1900) 201-.
- and pressure meter. *Hrabowski, K.* A. Ps. C. 56 (1895) 768-.
- Atwood's machine. *Praag, L. S. van. Leijd.* A. Ac. (1817-18) 24 pp.
- , and apparatus for pendulum experiments. *Fischer, E. G.* Gilbert A. 14 (1803) 1-.
- , application. *Pfaundler, —.* Innsb. Nt. Md. B. 14 (1884) xxiii.
- and clock, new. *Baker, W. C.* Ps. Rv. 11 (1900) 105-.
- , determination of friction resistances in. *Bender, C.* A. Ps. C. 149 (1873) 122-.

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- Atwood's machine, elasticity of cord in. *Bouniakowsky, V.* [1831] St Pét. Ac. Sc. Mm. 2 (1833) 179-.
- , fitting for. *Béquié, A.* J. de Ps. 2 (1883) 323-.
- , historical note. *Metz, G. G. de. Rs. Ps.-C. S. J.* 28 (Ps.) (1896) 33-; J. de Ps. 6 (1897) 604.
- , influence of wheel. *Külp, L.* Arch. Mth. Ps. 54 (1872) 206-.
- , measurement of gravity by. *Metz, G. G. de. Rs. Ps.-C. S. J.* 27 (Ps.) (1895) 37-; Fsehr. Ps. (1896) (Ab. 1) 255.
- , —, —, *Malagoli, R.* Rv. Sc. Ind. 29 (1897) 275-; Spet. It. Mm. 28 (1900) 174-, 199-.
- , modification. *Dupré, —.* Pogg. A. 58 (1843) 466-.
- , —, *Poggendorff, J. C.* Berl. B. (1853) 627-.
- , —, *Monte, P.* N. Cim. 11 (1860) 233-.
- , —, (Poggendorff's). *Barentin, W.* [1873] Pogg. A. (Jubelbd.) (1874) 213-.
- , —, —, *Bauer, K. L.* A. Ps. C. 17 (1882) 1037-.
- , new. *Mönnich, P.* Exner Rpm. 21 (1885) 31-.
- , oscillations of weights. *Tait, P. G.* [1881] Edinb. R. S. P. 11 (1882) 173-.
- , self-registering. *Schreiber, K.* N.-Vorp. Mt. 27 (1896) 99-; Z. Instk. 17 (1897) 204-.
- , utility. *Knappert, L.* Leijd. A. Ac. (1817-18) 9 pp.
- Fall of feather and coin, vacuum apparatus for demonstrating equal time of. *Lang, — von.* Wien Az. 24 (1887) 256-.
- heavy and light bodies, apparatus for demonstrating equal time of. *Cecchi, (padre) F. (xii)* Rv. Sc.-Ind. 4 (1872) 58-.
- Falling bodies in air, paradox. *Schneebeli, H.* A. Ps. C. 153 (1874) 466-.
- apparatus. *Bourbouze, —.* C. R. 54 (1862) 52-.
- , —, *Lippich, F.* [1865] Wien Sb. 52 (1866) (Ab. 2) 549-.
- , —, *Edelmann, T.* Carl Rpm. 7 (1871) 311-.
- , —, *Lebourg, E.* J. de Ps. 7 (1878) 44-.
- , *Engelbert [né Desbois], (le frère).* Les Mondes 50 (1879) 554-.
- , —, *Pâquet, É.* J. de Ps. 2 (1883) 226-.
- , —, *Krass, M.* Z. Instk. 4 (1884) 347-.
- , —, *Randall, H. M., & Markey, W. A.* Ps. Rv. 4 (1897) 64-.
- , —, electric. *Waldner, H.* A. Ps. C. 154 (1875) 597-.
- , experiments. *Haswell, C. H.* Franklin I. J. 24 (1852) 421-.
- , formula for space described by. *Seze, S. A.* N. Mg. Mtvd. 15 (1868) 180-.
- , Galileo's experiments. *Thurot, C.* J. de Ps. 3 (1874) 160-.
- , —, idea. *Mansion, —.* Brux. S. Sc. A. 18 (1894) (Pt. 1) 92-.
- , law. *Ausfeldt, —.* Voigt Mg. 4 (1802) 97-.
- , —, graphical demonstration. *Müller, Hub.* Sch. Nf. Gs. Vh. 52 (1868) 29-.

0825 Measurement of Force

Falling bodies, motion, with reference to change of gravity. *Grunert, J. A.* Pogg. A. 10 (1827) 457-.

—, Traversi's theories. *Marini, A. P.* Brescia Cm. (1816-17) 95-.

—, velocity, use of weighing-machine in determining. *Schönemann, T.* Berl. Mb. (1857) 159-.

Gravity machine with one loose and two fixed pulleys. *Kosch, F.* Arch. Mth. Ps. 17 (1900) 113-.

MEASUREMENT OF ENERGY OF VISIBLE MOTION.

E., J. P. Franklin I. J. 4 (1829) 212-.

Chronographs and apparatus for determining laws of motion. *Didion, I.* Fr. Cg. Sc. (1837) 549-.

Energy of bodies moving with different velocities. *Treadwell, D.* Bost. Mm. Am. Ac. 8 (1863) 362-.

—, measure of work in theory of. *Moon, R.* Ph. Mg. 47 (1874) 291-.

— transmission, comparison of methods. *Lauriol, J.* Gén. Civ. 9 (1886) 313-, 343-.

Kinetoscope, use in mechanics of slow motions. *Slichter, C. S.* Science 11 (1900) 535-.

Solids, motion. *Delanges, P.* Verona S. It. Mm. 3 (1786) 1-.

Watt's indicator, mathematical theory. *Le cornu, L.* C. R. 118 (1894) 1034-.

0825 Measurement of Force: Pendulum, Spring-balance, Torsion-balance.

(See also Astronomy 5100, Geology 07.)

Ewart, P. [1808] Manch. Ph. S. Mm. 2 (1813) 105-.

(Ewart.) *Hodgkinson, E.* [1844] Manch. Ph. S. Mm. 7 (1846) 137-.

Coste, —. Les Mondes 22 (1870) 379-.

Breton, P. Les Mondes 22 (1870) 615-.

Moore, R. V. Nost. Eng. Mg. 16 (1877) 335-.

Absolute units of force. *Johnson, W. W.* N.Y. Mth. S. Bll. 3 (1894) 197-.

Attractive and repulsive forces. *Zöllner, F.* Leip. B. 21 (1869) 281-.

Barometric vacuum, suggested use as spring of constant strength (*Cagniard de Latour*). *Caligny, A. de.* C. R. 59 (1864) 1103-; 62 (1866) 800-.

Bi- and tri-filar balances for absolute measurement. *Jaumann, G.* Wien Ak. Sb. 97 (1889) (Ab. 2a) 64-.

Centrifugal forces. *Zamboni, G.* [1841] Ven. Mm. I. 1 (1843) 413-.

Cotton-spinner, dynamic work. *Meugy, A.* A. Mines 14 (1848) 139-.

Dynagraph, Dudley's, uses. *Dudley, P. H.* [1879] Wash. Ph. S. Bll. 3 (1880) 29-.

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DYNAMOMETERS.

Regnier, E. Par. Éc. Pol. J. cah. 5 (1798) 160-; Par. Bll. S. Encour. 16 (1817) 133-.

Gordon, L. Glasg. Ph. S. P. 1 (1841-44) 41-.

Schinz, E. Dingler 110 (1848) 242-.

Richard, G. Lum. Élect. 6 (*1882) 559-; 7 (*1882) 18-, 29-, 78-, 100-, 174-; 8 (*1883) 297-; 16 (1885) 366-; 27 (1888) 551-; 32 (1889) 260-; 41 (1891) 209-.

Kapp, G. Elect. 12 (1884) 13-, 33-, 79-, 103-, 151-, 224-, 345-, 538-; 13 (1884) 8-, 79-, 201-.

Jamieson, —, & others. Elect. 12 (1884) 139-, et seq.

Bourcart, R. Mulhouse S. In. Bll. 61 (1891) 282-.

combined absorption and transmission. *Flather, J. J.* Am. As. P. (1898) 244-.

and comparison of ships in matter of resistance. *Ledieu, A.* C. R. 100 (1885) 837-.

— — — — — (Ledieu). *Taurines, A.* C. R. 102 (1886) 1057-.

— — — — — (Taurines). *Ledieu, A.* C. R. 102 (1886) 1091-.

coupling. *Perry, J., & Ayrton, W. E.* B. A. Rp. (1881) 553.

Desdouts's. *Dubost, F.* Lum. Élect. 12 (1884) 131-.

direct reading, *Trouvé, Trouvé, G.* C. R. 110 (1890) 1326-.

—, —. *Anon.* Rv. Sc.-Ind. 23 (1891) 34-.

dynamometric journal-bearing. *Rittinger, P.* Oestr. Z. Brgw. 4 (1856) 398-.

for effort of traction or force of animate motors. *Morin, A.* Par. Bll. S. Encour. 36 (1837) 161-.

— or work developed by animate or inanimate motors. *Morin, A.* Fr. Cg. Sc. (1837) 583-.

electric recording. *Resio, C.* C. R. 96 (1883) 1361-; Lum. Élect. 9 (*1883) 81-.

and ergometers. *Richelmy, P.* Tor. At. Ac. Sc. 5 (1869-70) 17-.

Fischinger's. *Buschkiel, C.* Elekttech. Z. 8 (1887) 386-.

friction-. *Barrois, T.* Lille Mm. S. (1827-28) 114-.

— *Thomson, J.* (vi Adds.) B. A. Rp. (1855) (pt. 2) 209-.

— *Mayer, J. R. von.* D. Nf. Tbl. (*1869) 63-.

— *Guigon, —.* [1882] I. Égypt. Bll. 3 (*1883) 14-.

— *Menges, C. L. R. E.* 's Gravenh. I. Ing. Ts. (1886-87) (Verg.) 81-.

— *Beaumont, W. W.* I. CE. P. 95 (1889) 1-.

— *Rigaut, A.* Lum. Élect. 36 (1890) 610-.

— *Goss, W. F. M.* Elect. Rv. 37 (1895) 98-, 125-, 158-.

—, and belt-. *Froude, W.* (vi Adds.) ME. I. P. (1858) 92-.

—, direct reading. *Jimels, C.* Gén. Civ. 17 (1890) 375-.

—, Prony's (for revolving shaft). *Prony, R. de.* A. C. 19 (1821) 165-.

friction, Prony's. *Saint-Léger*, — de. A. Mines 12 (1837) 67—.

—, — (Saint-Léger). *Poncelet, J. V. C. R.* 4 (1837) 678—.

—, —. *Poncelet, J. V. C. R.* 4 (1837) 885—.

—, —. *Passot*, —. Fr. Cg. Sc. 8 (1840) 31—.

—, —. *Morris, E. Franklin I. J.* 5 (1843) 225—.

—, —. *Pigeon, G. Lyon Ac. Sc. Mm.* 2 (1847) 507—.

—, —. *Grandvoinnet, J. A. Gén. Civ.* 2 (1863) 170—.

—, —. *Tresca, H. C. R.* 58 (1864) 273—.

—, —. *Kretz*, —. C. R. 58 (1864) 459—; Par. Ec. Norm. A. 2 (1873) 55—.

—, —, arranged for evaluation of torque. *Hillairet*, —. C. R. 109 (1889) 798—.

—, —, modifications. *Garnier, F. A. Mines* 12 (1837) 247—.

—, —, reversed. *Wellner, G. Dingler* 223 (1877) 130—.

—, — and Welter's combined. *Hachette, J. N. P. J. Gén. Civ.* 11 (1846) 153—.

—, —. *Raffard. Soubeyran, A.* [1885] Gén. Civ. 8 (1885-86) 68—.

—, —. *Ventre*, —. [1886] I. Egypt. Bll. 7 (1887) 50—.

—, —, run by circulation of water. *Ricco, A.* (xii) Rv. Sc.-Ind. 12 (1880) 443—.

—, —, self-regulating. *Carpentier, J. C. R.* 89 (1879) 950—.

—, —, for small motors. *Maréchal, C. Éclair. Élect.* 11 (1897) 210—.

—, —. *Thiabaud. Bernardi, E. Ven. I. At.* (1884-85) 1355—.

of "Hirondelle." *Albert, (Prince de Monaco).* Par. S. Gg. C. R. (1889) 98—.

improved. *Tatham, W. P. Franklin I. J.* 82 (1881) 321—; 84 (1882) 401—.

integrating. *Richard, G. Lum. Élect.* 16 (1885) 366—.

—, —. *Raffard*, —. Par. S. Ps. Sé. (1887) 178—.

—, —, of Meeze and Vernon-Boys. *Richard, G. Lum. Élect.* 14 (1884) 11—.

at International Exhibition. *Guerout, A. Lum. Élect.* 4 (*1881) 290—, 307—, 341—, 356—, 373—.

Morin's. *Trépied, C. Lum. Élect.* 1 (*1879) 85—.

new. *Cagniard-Latour, C. C. R.* 4 (1837) 899—.

—, —. *Froude, W. Bath S. J.* 5 (1857) 216—.

—, —. *Richard, G. Lum. Élect.* 8 (*1883) 297—.

Newcastle. *Amos, C. E. Ag. S. J.* 1 (1865) 204—.

optical. *Latchingoff, M. Lum. Élect.* 3 (*1881) 447—.

Poncelet's, profile of springs. *Léauté, H. Liouv. J. Mth.* 9 (1883) 245—.

for power of screws of ships. *Froude, W. I. ME. P.* (1877) 237—.

rotation, Frémont. *Desquiens, F. Gén. Civ.* 21 (1892) 260—.

—, —. *Richard. Gouilly, A. Gén. Civ.* 20 (1891-92) 395—.

at Royal Technological Institute, Stockholm. *Nystrom, J. W. Franklin I. J.* 49 (1865) 392—.

Ruggles's. *Eliot, C. W.* [1866] Am. Ac. P. 7 (1868) 65—.

for small motors. *Hoskin, J. Franklin I. J.* 131 (1891) 489—.

—, —, steam engines (Macnaught). *Combes, C. A. Mines* 16 (1839) 519—.

suitable for physiological inquiries. *Henry, C. C. R.* 121 (1895) 716—.

Tatham. *Tatham, W. P. Franklin I. J.* 120 (1885) 449—; 122 (1886) 377—.

transmission. *Ayrton, W. E., & Perry, J. Lum. Élect.* 3 (*1881) 405—.

—, —. *Thomson, E. Franklin I. J.* 81 (1881) 117—.

—, —. *Curie, P. C. R.* 103 (1886) 45—.

—, —. *Guigon, E.* [1888] I. Egypt. Bll. 9 (1889) 174—.

—, —. (Guigon). *Ventre*, —. [1888] I. Egypt. Bll. 9 (1889) 185—.

—, —. *Robinson, S. W. Elect. Rv.* 38 (1896) 625—, 656—.

—, —, autographic. *Kent, W.* [1879] Am. I. Mn. E. T. 8 (*1880) 177—.

—, —, with direct reading and photographic record. *Mascart*, —. C. R. 110 (1890) 605—.

—, —, electric. *Kuzminskij, P. D. Rs. Ps.-C. S. J.* 28 (Ps.) (1896) 226—.

—, —, new. *Deprez, M. Lum. Élect.* 13 (1884) 481—.

—, —. *Meylan, E. Lum. Élect.* 27 (1888) 424—.

—, —. *Dalby, W. E. I. CE. P.* 132 (1898) 47—.

—, —, permanent. *Smith, C. A.* [1884] Am. S. CE. T. 15 (1886) 357—.

for use with driving-bands. *Hefner-Alteneck, F. von.* (xii) Elekttech. Z. 2 (1881) 229—.

with vernier. *Kleritj, L. Berg-Hm. Ztg.* 29 (1870) 3—, 16—.

Dynamometric experiments (Ransonnet's). *Keraudren*, —. J. Méd. Chir. Phm. 24 (1812) 41—.

—, —. *Dollfus, G.* (vii) Mon. Sc. 3 (1861) 29—.

—, —, methods on railways. *Desdouts*, —. A. Mines 8 (1885) 481—.

—, —, testing of agricultural implements. *Grandvoinnet, J. A.* (xii) A. Agn. 2 (1876) 446—.

Ergograph, new. *Binet, A., & Vachide, N. C. R.* 125 (1897) 1161—.

Ergometers. *Hefner-Alteneck*, — von. Elekttech. Z. 8 (1887) 514—; 9 (1888) 16—.

Explosive pressures, use of springs in measuring. *Vieille, P. C. R.* 115 (1892) 1268—.

Explosives, force. *Vieille, P. As. Fr. C. R.* (1890) (Pt. 1) 53—.

Gas-motors, atmospheric, power measurement. *Teichmann, K. Dingler* 220 (1876) 116—.

Horse-power. *Gregory, O. Nicholson J.* 11 (1805) 145—.

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- *Agamennone, G.* Rm. R. Ac. Linc. Rd. 9 (1900) (Sem. 1) 204-.
- improved form. *Herschel, A. S.* N. Eng. I. Mn. E. T. 37 (1888) 101-.
- magnetograph as. *Mendenhall, T. C.* Am. As. P. (1890) 89.
- mercury. *Cavalli* (1784). *Baratta, M.* [1896] Pisa S. Tosc. At. (PV.) 10 (1895-97) 191-.
- , contributions to history. *Baratta, M.* Pisa S. Tosc. At. (PV.) 10 (1895-97) 243-; 11 (1897-98) 84-.
- and seismological investigations. *Mendenhall, T. C.* Am. J. Sc. 35 (1888) 97-.
- Trifilar gravimeter. *Schmidt, A.* Btr. Geops. 4 (1900) 109-.
- Tromoseismometer. *Bertelli, T.* Rm. N. Linc. At. 27 (1874) 194-.
- Vibrations, seismic, and seismometric indications. *Bertelli, T.* Rm. N. Linc. At. 42 (1889) 95-; Rm. N. Linc. Mm. 6 (1890) 67-.
- Spring balance. *Oeri, —.* Sch. Gs. Vh. (1841) 212-.
- for accurate weighing. *Jolly, P.* Münch. Sb. (1864) 1) 162-.
- Spring balance, improved, for Prony brakes. *Wettler, A.* Elekttech. Z. 19 (1898) 658-.
- , new. *Steinhilber, C. A. von.* Münch. Gelehrte Az. 8 (1839) 817-.
- , — form. *Linebarger, C. E.* Ps. Rv. 11 (1900) 110-.
- Springs, use in apparatus for delicate measurements. *Witz, —.* Brux. S. Sc. A. 21 (1897) (Pt. 1) 19-.
- Steam-engine, measurement of useful force in, without brake. *Mahistre, —.* C. R. 46 (1858) 39-.
- Suspension, bifilar, measurement by. *Stähelin, C.* Sch. Gs. N. D. 13 (1853) vi+204 pp.
- , —, mechanical temperature compensation. *Liznar, J.* Z. Instk. 8 (1888) 13-, 76.
- , trifilar, use in physical apparatus. *Thompson, S. P. B. A.* Rp. (1897) 588.
- , unifilar, value of torsional couple. *Limb, C.* C. R. 114 (1892) 1057-.
- Thermodynamometer, description and theory. *Berruti, G.* Tor. At. Ac. Sc. 7 (1871-72) 485-.
- Torsion balance, American. *Dittmar, W.* Z. Instk. 10 (1890) 433-.
- , —, Coulomb's. *Müncke, G. W.* Pogg. A. 17 (1829) 159-; 18 (1830) 239-; 29 (1833) 381-.
- , —, modification. *Gieseler, —.* Bonn Niedr. Gs. Sb. (1891) 83.
- , counteracting change of level in. *Kent, W.* Am. As. P. (1886) 116.
- , effect of bodies at various temperatures near arm. *Lenz, E.* Pogg. A. 25 (1832) 241-.
- , mirror for use with. *Kent, W.* Am. As. P. (1886) 116-.
- , new. *Springer, A.* Am. I. Mn. E. T. 12 (1884) 569-.
- , —, experiments. *Reich, F.* Leip. Ab. Mth. Ps. 1 (1852) 383-.
- , —, oscillations, theory. *Brandes, H. W.* Voigt Mg. 12 (1806) 300-.
- , —, resistance of air. *Baille, J. B., & Cornu, A.* C. R. 86 (1878) 571-.
- , —, terms proportional to square of displacement in. *Baille, J. B., & Cornu, A.* C. R. 86 (1878) 1001-.
- , —, unifilar. *Tammen, H. G.* Carl Rpm. 18 (1882) 348-.
- balances. *Springer, A. B. A.* Rp. (1887) 636.
- , —, and elasticity of glass threads. *Ritchie, W.* Phil. Trans. (1830) 215-.
- , —, —. *Goode, W. H.* Franklin I. J. 24 (1839) 367-.
- , of fine threads. *Bouasse, H.* A. C. 11 (1897) 433-.
- method of determining small weights. *Loewenherz, L.* (xii) Z. Instk. 1 (1881) 184-.
- Torsional moments, method of determining. *Negbauer, W.* A. Ps. C. 41 (1890) 631-.
- Trains, energy stored in, at different velocities. *Dudley, P. H.* Am. Eng. & Railroad J. 73 (1899) 366.
- , tractive force, resistance, and acceleration. *Mallock, A. B. A.* Rp. (1900) 877-.

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- Watt and the measurement of power. *Preece, W. H.* Elect. 38 (1897) 511-.
- Work done by men. *Field, Jos.* CE. I. T. 2 (1838) 211-.
- — — — under various conditions. *Coulomb, C. A.* Par. Mm. de l'I. 2 (1799) 380-.
- of man using crank. *Hecht, D. F.* N. Bergm. J. 4 (1804) 185-.

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- Action of powder in gun, theoretical determination. *Wrede, F. J.* Stockh. Ak. Hndl. 10 (1871) No. 1, 42 pp.
- Air meter, integrating. *Morin, A.* C. R. 54 (1862) 232-.
- — — — for measuring draught for furnaces. *Kallstenius, G. S.* Stockh. Ak. Hndl. (1820) 260-; *Karsten Arch. Bergbau* 5 (1822) 345-.
- — — — velocity of air in flues and chimneys. *Fletcher, A. E.* B. A. Rp. 37 (1867) (Sect.) 33-; 39 (1869) (Sect.) 48-; *Lpool. Lt. Ph. S. P.* 24 (1870) 31-.
- — — — mines, etc. *Combes, C.* A. Mines 13 (1838) 103-.
- Barometer, mathematical theory of oscillations. *Liais, E.* Cherb. Mm. S. Ac. (1852) 97-.
- , mercury, new forms. *Guglielmo, G.* Rm. R. Ac. Line. Rd. 2 (1893) (Sem. 1) 474-.
- Compressibility of gases. *Akin, C. K.* Ph. Mg. 25 (1863) 289-.
- Compression of gases. *Despretz, C.* A. C. 34 (1827) 335-.
- — liquids. *Despretz, C.* C. R. 21 (1845) 216-.
- Dubuat's paradox on solid in moving fluid and vice versa. *Zukovskij, N. E.* Mosc. S. Sc. Bll. 73 (No. 1) (1891) 21-; *Fsch. Ps.* (1891) (Ab. 1) 253-.
- Efflux of air, experiments. *Wilde, H.* Manch. Lt. Ph. S. Mm. 10 (1887) 182-.
- Elastic after-effect in spring barometer. *Reinhertz, C.* Z. Instk. 7 (1887) 153-, 189-.
- Expansive power of compressed air compared with that of powder gas. *Borkenstein, F.* Mg. Ntvd. 8 (1828) 121-.
- Flow of fluid down inclined plane. *Seddon, J. A.* [1888] *St. Louis Ac. T.* 5 (1892) xxviii-.
- — gases. *Reynolds, O.* [1885] *Manch. Lt. Ph. S. Mm.* 10 (1887) 164-.
- — —, constant. *Hugoniot, H.* C. R. 102 (1886) 1545-; A. C. 9 (1886) 375-.
- Gas governor, needle. *Peebles, D. B.* [1879] *Sc. S. Arts T.* 10 (1883) 303-.
- meter, wet. *Ullherr, J. C.* Dingler 165 (1862) 259-; 166 (1862) 112-.
- — —, at constant level. *Moors, B. P.* Delft Éc. Pol. A. 4 (1888) 168-; 5 (1889) 139-.

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- Gas meters. *Elser, R. W.* (vi Add.) Berl. Pol. Gs. Vh. 17 (1856) 61-.
- —, apparatus for gauging. *Ruhlmann, —.* Dingler 155 (1860) 337-.
- —, improved method of maintaining just water level. *Sanders, G.* *Dubl. R. S. J.* 1 (1856-57) 32-.
- —, improvements. *Abria, —.* *Bordeaux Act.* (1850) 509-.
- , regulation of pressure. *Cavaillé-Coll, A.* C. R. 56 (1863) 339-.
- Gasometer with uniform pressure. *Steevens, J.* *Tilloch Ph. Mg.* 24 (1806) 163-; 27 (1807) 34-.
- Impact of water on plane surface, Weisbach's theory. *Smith, W. C., & Sheble, F.* *Franklin I. J.* 124 (1887) 257-.
- Instrument to measure force of blast in bellows, etc. *Banks, —.* [1800] *Manch. S. Mm.* 5 (1802) 398-.
- — — — — — — —, and experiments on flow of air from vessels. *Gilbert, L. W.* *Gilbert A.* 22 (1806) 286-.

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- Rettberg, E. F.* *Gilbert A.* 42 (1812) 99-.
- Russell, H.* *Tilloch Ph. Mg.* 63 (1824) 92-.
- Ziegler-Pellis, J.* *Act. S. Helv.* (1858) 128-.
- Silva-Pinto, M. V. da.* *Lisb. J. Sc. Mth.* 3 (1871) 239-.
- Yagn [Jagn], N.* [1876] (xii) *Mosc. S. Sc. Bll.* 39 [No. 2] (1880) 181-.
- Kraevich, K. D.* (xii) *Rs. C. Ps. S. J.* 9 (Ps.) (1877) [(Pt. 1)] 252-.
- Bristol, W. H.* *Am. As. P.* (1888) 89-.
- Villard, —.* C. R. 116 (1893) 1124-.
- balance. *Schreiber, K. A. P.* (xii) *Z. Instk.* 1 (1881) 257-, 288-, 333-.
- bell. *Rateau, —.* *As. Fr. C. R.* (1892) (Pt. 1) 160.
- for blast-engines. *Nordenskiöld, N.* [1837] *St. Pét. Ac. Sc. Bll.* 3 (1838) 265-.
- Bourdon. Samuelson, A.* *Civing.* 7 (1861) 455-.
- , *Worthington, A. M.* *Nt.* 41 (1890) 296.
- , *Greenhill, A. G.* *Nt.* 41 (1890) 517-.
- , *Worthington, A. M.* *Nt.* 42 (1890) 125-.
- , *Rayleigh, (Lord).* *Nt.* 42 (1890) 197.
- , formulæ. *Résal, H.* *A. Mines* 11 (1867) 381-.
- , *Tait, and Amagat* gauges, comparison. *Barus, C.* *Ph. Mg.* 31 (1891) 400-.
- compensation, for air pressure. *Prytz, K.* *Ts. Ps. C.* 24 (1885) 129-, 224; *Fsch. Ps.* (1885) (Ab. 1) 391-.
- compressed air. *Machado, V.* [1892] *Lisb. J. Sc. Mth.* 9 (1883) 110-.
- , *Lussana, S.* *N. Cim.* 12 (1900) 237-.
- , general formulæ, and for stereometer. *Volpicelli, P.* *Tortolini A.* 8 (1857) 169-.
- —, graduation. *Garnault, E.* (vii) *A. Gén. Civ.* 2 (1863) (pt. 2) 377-.
- construction and use. *Lemkes, C. R. L.* [1894] *Glasg. I. Eng. T.* 38 (1895) 15-.

- crusher, law of resistance of cylinder. *Vieille, P.* C. R. 114 (1892) 1468-.
- , measurement of pressure by. *Kellner, W., & Deering, W. H.* R. S. P. 57 (1895) 404-.
- , — of explosives by. *Sarrau, —, & Vieille, —.* C. R. 102 (1886) 1054-.
- data for use with. *Amagat, E. H.* C. R. 99 (1884) 1017-, 1153-.
- differential. *König, A. C.* Ztg. 13 (1889) 1159; *Dingler* 275 (1890) 513-.
- (König). *Käß, A.* Oestr. Z. Brgw. 38 (1890) 308-.
- (—). *Brown, M. W.* [1892] N. Eng. I. Mn. E. T. 41 (1893) 160-; 42 (1893) 50.
- mercury. *Ravenek, H. A.* 's Gravenh. I. Ing. Ts. (1884-85) (Vh.) 1-.
- piston, for very high pressures. *Amagat, E. H.* C. R. 103 (1886) 429-.
- Edson self-recording. *Franklin Inst. Comm.* Franklin I. J. 137 (1894) 241-.
- electric. *Deprez, M.* Par. S. Ps. Sé. (1879) 20-.
- , for small variations of pressure. *Richard, G., & Richard, L.* C. R. 112 (1891) 1359-.
- Kundt's. *Dvořák, V.* Wien Sb. 68 (1873) (Ab. 2) 7-.
- 2-liquid amplifying. *Grenier, W.* Laus. S. Vd. Bll. 13 (1874-75) 652-.
- differential. *Achard, A.* Arch. Sc. Ps. Nt. 49 (1874) 344-.
- McLeod gauge and air pumps. *Bertin, A. A.* C. 19 (1880) 231-.
- metallic, theory. *Marangoni, C.* (xii) Rv. So.-Ind. 12 (1880) 326-.
- micromanometer. *Smits, A.* Amst. Ak. Vs. 4 (1896) 145-, 198; 5 (1897) 292-; Arch. Néerl. 1 (1898) 97-.
- mirror. *Parragh, G.* Term. Közl. 20 (1888) (Suppl.) 78-; Mth. Nt. B. Ung. 6 (1889) 408-.
- , *Kont, G.* Mth. Term. Ét. 12 (1894) 277-.
- new method of reading. *Marek, W. J.* Carl Rpm. 16 (1880) 585-.
- open (Richard). *Combes, C.* A. Mines 7 (1845) 481-.
- , *Hemptinne, A. D. de.* Brux. Ac. Bll. 12 (1845) 541-.
- , on Eiffel Tower. *Cailletet, L.* C. R. 112 (1891) 764-.
- , —, *Nansouty, M. de.* Gén. Civ. 18 (1890-91) 385-.
- , for high pressures. *Cailletet, L.* C. R. 84 (1877) 82-.
- , low pressures. *Marnier, A.* Dingler 255 (1885) 471-.
- for high pressures. *Seaward, S.* Tilloch Ph. Mg. 63 (1824) 36-.
- , —, *Cailletet, L.* C. R. 83 (1876) 1211-; Les Mondes 42 (1877) 50-, 239-, 450-.
- , —, *Marié, G.* I. ME. P. (1880) 455-.
- , —, *Tait, P. G.* Edinb. R. S. P. 10 (1880) 572-.
- , —, *Thiesen, M. F.* (xii) Z. Instk. 1 (1881) 114-.
- , —, *Nansouty, M. de.* Gén. Civ. 9 (1886) 19-.
- low pressures of gas. *McLeod, H.* I. Ps. S. P. 1 (1876) 30-; Ph. Mg. 48 (1874) 110-.
- Rateau's, with magnified scale. *Hauer, J. von.* Oestr. Z. Brgw. 41 (1893) 5-.
- self-recording. *Giltay, J. W.* [1882] 's Gravenh. I. Ing. Ts. (1893) 95-.
- , for guns. *Vieille, P.* C. R. 112 (1891) 1052-.
- , for high pressures. *Minotti, N. G.* Ven. At. 5 (1846) 311-.
- , —, —, *Parenty, H.* C. R. 102 (1886) 811-; *Dingler* 264 (1887) 74-.
- sensitive. *Villard, —.* C. R. 116 (1893) 1187-.
- , *Charpentier, P.* C. R. 120 (1895) 439-.
- of simple construction. *Guglielmo, G.* Rv. Sc.-Ind. 25 (1893) 175-.
- spring, apparatus for testing. *Giltay, J. W.* Z. Instk. 5 (1885) 395-.
- standard. *Kamerlingh Onnes, H.* Amst. Ak. Vs. 8 (1900) 45-; Amst. Ak. P. 2 (1900) 29-.
- , mercury meniscus, correction. *Schalkwijk, J. C.* [1900-01] Amst. Ak. Vs. 9 (1901) 462-, 512-; Amst. Ak. P. 3 (1901) 421-, 481-.
- open, of reduced height. *Kamerlingh Onnes, H.* [1898] Amst. Ak. Vs. 7 (1899) 176-; Amst. Ak. P. 1 (1899) 213-.
- telegraphic. *Armellini, T.* Rm. N. Linc. At. 28 (1875) 229-.
- uniformly sensitive. *Moutier, J.* Par. S. Phlm. Bll. 1 (1877) 171-.
- for highest vacua. *Sutherland, W.* Ph. Mg. 43 (1897) 83-.
- vapour-tension. *Perrier, L.* C. R. 91 (1880) 538-.
- water. *Forbes, J. D.* Edinb. N. Ph. J. 19 (1835) 36-.
- , and anemometer. *Silliman, J. M.* [1888] Am. I. Mn. E. T. 17 (1889) 66-.
- Wollaston's. *Napier, J. R.* Glasg. T. I. Eng. 12 (1869) 119-.

Manometry, influence of weight on. *Kapustin, T.* Rs. Ps.-C. S. J. 26 (Ps.) (1894) 307-; J. de Ps. 4 (1895) 585-.

Manostat. *Smits, A.* [1897] Amst. Ak. Vs. 6 (1898) 321-; Z. Ps. C. 33 (1900) 39-.

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— in mines. *Dickinson, J.* [1875] Manch. Gl. S. T. 14 (1878) 31-.

— draught and analysis of gas, apparatus. *Kasalovský, J.* Oestr. Z. Brgw. 26 (1878) 407-.

— in chimneys. *Schwartz, L.* Erdm. J. Tech. C. 2 (1828) 345-.

— very high vacua. *Rood, O. N.* Am. J. Sc. 22 (1881) 90-.

— velocity by gauging tube. *Bazin, H.* A. Pon. Chaus. 14 (1887) 195-.

— vis viva of fluid in pipe. *Masoni, U.* Nap. I. Inc. At. 11 (1898) No. 2, 4 pp.

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—, modifications. *Darcy, H.* *Dijon Mm. Ac.* 6 (1857) (pte. 2) 159-.

Pneumatic analogue of potentiometer. *Shaw, W. N. B. A. Rp.* (1898) 778-.

— — — Wheatstone's bridge. *Shaw, W. N. R. S. P.* 47 (1890) 462-.

— brakes. *Huberti, A. Rv. Un. Mines* 1 (1888) 1-.

— —, quick working. *Kapteyn, A. P.* 's Gravenh. *I. Ing. Ts.* (1888-89) (*Vh.*) 103-, 122-.

Powder gases, movement in bore of gun. *Piobert, —.* *C. R.* 49 (1859) 757-, 829-, 909-, 953-.

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Bevan, B. *Ph. Mg.* 6 (1829) 284-.

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—, balance. *Perrigault, —.* *Les Mondes* 38 (1875) 355-.

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—, by mirror method. *Röntgen, W. C. A. Ps. C.* 51 (1894) 414.

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von Drieberg's views. *Kersting, R.* [1845] (*VIII*) *Riga Cor.-Bl.* 1 (1846) 81-.

effective, in hydraulic presses, arrangement of levers for measurement. *Köpping, H. Carl Rpm.* 17 (1881) 662-.

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— fluid jet on wedge. *Kotelnikov, A. P. Kazan S. Nt. (Ps.-Mth.) P.* 8 (1890) 4-; *Fachr. Ps.* (1889) (*Ab.* 1) 358-.

— fluids in motion. *Bonnycastle, C.* [1840] *Am. Ph. S. T.* 7 (1841) 113-.

— — —, instrument for measuring. *Caligny, A. de. Par. S. Phlm. PV.* (1840) 106-.

— gas, measurement under different conditions. *Prytz, K. Ts. Ps. C.* 30 (1891) 289-.

—, regulation. *Obach, E. Tel. E. J.* 14 (1885) 339-.

—, regulator. *Murrill, P. Mer. S. J.* (1898) 480-.

—, regulators. *Peebles, D. B.* [1876] *Sc. S. Arts T.* 9 (1878) 351-.

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—, *Marié, G. A. Mines* 19 (1881) 104-.

—, *Barus, C. Am. Ac. P.* 25 (1890) 93-.

—, *Jacobus, D. S. Am. As. P.* (1893) 123-.

—, *Lisell, E. Stockh. Öfv.* (1898) 697-.

—, *Palmer, A. de F. Am. J. Sc.* 6 (1898) 451-.

—, apparatus for production. *Stratton, S. W. Ph. Mg.* 38 (1894) 160.

indicator for pneumatic brake. *Kapteyn, A. P.* [1886] 's Gravenh. *I. Ing. Ts.* (1886-87) (*Vh.*) 102-.

— — Westinghouse brake. *Kapteyn, A. P. Rv. Un. Mines* 19 (1886) 86-.

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—, in moving liquid. *Boussinesq, J. Liouv. J. Mth.* 9 (1883) 425-.

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lateral, apparatus for demonstrating. *Carl, P. Carl Rpm.* 11 (1875) 68-.

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— — —, *Guglielmo, G. Rm. R. Ac. Linc. Rd.* 2 (1893) (*Sem.* 2) 8-.

on part of surface of fluid. *Schiller, N. Mosc. S. Sc. Bl.* 91 (*No.* 1) (1894) 31-.

— plate and wedge by Kirchhoff's method. *Réthy, M. (xn) Orv.-Term. Éts.* 4 (1879) (*Term. Szak*) 105-.

potential. *Lyapunov, A. M. (xn) Rs. Ps.-C. S. J.* 13 (*Ps.*) (1881) [(*Pt.* 1)] 351-.

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produced by change of velocity in water pipes. *Frizell, J. P. Am. S. CE. T.* 39 (1898) 1-.

— — explosive gaseous mixtures. *Petavel, J. E. B. A. Rp.* (1900) 655-.

— — powder gases, accelerograph of Deprez for measuring. *Sebert, H. Par. S. Ps. S6.* (1879) 107-.

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sounding apparatus for ships. *Anon. Rv. Sc.-Ind.* [24 (1892)] 220-.

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of stream of air on flat plate. *Willis, (Prof.) R.* [1828] *Camb. Ph. S. T.* 3 (1830) 129-.

- of stream, infinite, on wedge-shaped wall. *Bobuilev, D. K.* (xii) *Rs. Ps.-C. S. J.* 13 (Ps.) (1881) [Pt. 1] 63-; (ix) *A. Ps. C. Beibl.* 6 (1882) 163-.
- at right angles to direction of current. *Ludwig, C., & Stefan, J.* *Wien SB.* 32 (1858) 25-.
- streams. *Cattaneo, G.* [1822] *Padova N. Sag.* 2 (1825) 224-.
- on surface of immersed body. *Razzaboni, C.* [1862] (xi) *Mod. Ac. Sc. Mm.* 5 (1863) 3-.
- plane or curved. *Martynowski, A.* *Par. T. Nauk Śc. Pam.* 3 (*1873) 215-; 4 (*1874) *Art.* 1, 78 pp.
- —, theory. *Steen, A.* [1872] *Kjöb. Skr.* 9 (1873) 539- (*Res.* 558-).
- and temperature measurements, capillary corrections. *Pernet, J. Z. Instk.* 6 (1886) 377-.
- theory. *Cournot, A. A.* (vi *Adds.*) *Férussac Bll. Sc. Mth.* 9 (1828) 10-.
- *Moon, R. Ph. Mg.* 36 (1868) 27-, 116-.
- true theory as applied to elastic fluids. *Moon, R.* (viii) *Ph. Mg.* 26 (1863) 70-.
- variation in fluid in motion. *Lagerhjelm, P.* *Sk. Nf. F.* 3 (1842) 319-.
- on wall (passage in Fischer's Physics). *Volpicelli, P. G. Arcad.* 49 (1831) 103-.
- (— — —) (Volpicelli). *Oddi, G. G. Arcad.* 50 (1831) 62-.
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0840 Elastic Deformation of Solids. Compressibility and Rigidity. Elongation, Torsion, Flexure, Young's Modulus.

(See Mechanics :

- 3200 Elasticity, general.
- 3210 Strain and stress. Stress-strain relations. Strain-energy. *Æolotropy*. Crystals.
- 3220 Equations of elastic deformation and motion. General solutions. Special solutions. Vibrations.
- 3230 Torsion and flexure of prisms.
- 3240 Elastic rods and wires; springs.
- 3245 Elastic frameworks.
- 3250 Elastic plates and shells.
- 3260 Impact and rebound. Travelling loads.
- 3270 Stability of elastic systems.
- 3280 Principles of construction, including approximate formulæ for resistance of materials.)

Experimental determination of elastic constants.

(See also Mechanics 3600, 3630, 3650.)

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- , —, — (Thomas). *Govi, G.* *Les Mondes* 19 (1869) 640-.
- , —, — (Govi). *Thomas, P.* *Les Mondes* 20 (1869) 8-.
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- under stress, temperature changes in, testing apparatus. *Wassmuth, A.* Wien Ak. Sb. 97 (1889) (Ab. 2a) 52-.
- , telegraph-, mechanical testing. *Culley, R. S.* (ix) Tel. E. J. 2 (1873) 211-.
- , —, —, apparatus for. *Rothén, T.* J. Tél. 4 (1878-80) 697-.
- Minerals, dense, constants of some. *Voigt, W., & Drude, P.* Gött. Nr. (1889) 519-; (1890) 542-.
- , —, —, —, *Drude, P., & Voigt, W.* A. Ps. C. 42 (1891) 537-.

MODULI OF ELASTICITY.

- adiabatic elastic constants. *Voigt, W.* Gött. Nr. (1888) 359-.
- determination by flexure of bars. *Koch, K. R.* A. Ps. C. 5 (1878) 251-.
- , —, —, *Pscheidl, W.* Wien Ak. Sb. 79 (1879) (Ab. 2) 114-; 86 (1883) (Ab. 2) 115-.
- , new method. *König, A.* Berl. Ps. Gs. Vh. (1885) 59-.
- , 's Gravesande's method. *Oberbeck, A. A.* Ps. C. 37 (1889) 526.
- , —, *Stradling, G.* A. Ps. C. 41 (1890) 330-.
- for small loads. *Weston, C. P.* Ps. Rv. 8 (1899) 297-.

- determination for small quantities of material, and some high moduli. *Auerbach, F.* A. Ps. C. 58 (1896) 381-.
- by tension experiments. *Brix, A. F. W.* Grunert Arch. 4 (1844) 239-.
- theory of balance spring. *Phillips, É.* C. R. 56 (1863) 296-; 58 (1864) 449-; A. Mines 15 (1869) 65-.
- vibrations. *Kurz, A.* Exner Rpm. 19 (1883) 246-.
- and elastic limit, determination. *Phillips, É.* C. R. 88 (1879) 315-.
- Hooke's law, apparent exceptions to. *Brillouin, M.* A. C. 13 (1898) 231-.
- and moduli of resistance. *Winkler, E.* Civing. 9 (1863) 405-.
- new constant, definition and determination, and correction of modulus. *Tammen, H. G.* (xii) Zwick. Vr. Nt. Jbr. (1880) 21-.
- primary and secondary longitudinal moduli and thermal constants of latter. *Miller, A.* Münch. Ak. Ab. 15 (1886) 705-.
- of rod as function of strain. *Hartig, E.* Civing. 39 (1893) 113-.
- temperature, effect on modulus. *Mayer, A. M.* [1894] Am. J. Sc. 1 (1896) 81-, 250.
- , —, —, particularly of metals. *Kupffer, A. T.* [1852-56] St. Pét. Ac. Sc. Mm. 8 (1857) 397-; St. Pét. Ac. Sc. Bll. 14 (1856) 273-, 289-.
- and of thermal capacity, and other physical constants, relations. *Tomlinson, H. R. S.* P. 38 (1885) 488-.
- thermal and elastic phenomena, relations. *Mai, E.* Mil. I. Lomb. Rd. 24 (1891) 1050-.
- , —, —, —. *Alibrandi, P.* G. Mt. 38 (1900) 77-.
- expansion and extensibility of wires and caoutchouc, relations. *Kurz, A.* Exner Rpm. 22 (1886) 547-; 27 (1891) 631-.
- , temperature and torsion modulus, relations. *Sayno, A.* Mil. I. Lomb. Rd. 24 (1891) 293-, 574-.
- and vibrations as function of molecular weights and specific heat. *Foerster, O. Z.* Mth. Ps. 41 (1896) 258-.
- Young's, determination, principles. *Miller, A.* Münch. Ak. Ab. 16 (1888) 569-.
- , influence of magnetisation. *Tangl, K.* [1900] Mth. Termt. Éts. 18 (1900) 49-; Mth. Nt. B. Ung. 18 (1903) 7-.
- , —, —, heat and electric current. *Noyes, M. C.* Ps. Rv. 3 (1896) 432-.
- Poisson's ratio. *Poisson, S. D.* A. C. 36 (1827) 384-.
- , *Schneebeli, H.* Zür. Vjschr. 14 (1869) 375-.
- , *Mallock, A.* R. S. P. 29 (1879) 157-.
- , *Kayser, E.* [1887] Danzig Schr. 7 (1888-91) (Heft 1) xiii-.
- and Lamé's formule, experimental verification. *Amagat, E. H.* C. R. 106 (1888) 479-.
- for prisms. *Bauschinger, J.* Civing. 25 (1879) 81-.

- Poisson's ratio at various temperatures. *Dahlander, G. R.* Stockh. Öfv. (1886) 213-; Pschr. Ps. (1886) (Ab. 1) 470-.
- Resilience. *Tredgold, T.* Tilloch Ph. Mg. 51 (1818) 276-.
- Rigidity. *Gerstner, F. A. von.* Pogg. A. 26 (1832) 269-.
- , *Gollner, H.* Dingler 273 (1889) 205-.
- , torsion and flexure, experiments. *Everett, J. D.* Phil. Trans. 157 (*1867) 189-; 158 (1868) 363-; B. A. Rp. 38 (1868) (Sect.) 8.
- Slates, flexural strength. *Hanisch, —.* Brux. S. Blg. Gl. Bll. (1897) (PV.) 48.
- , —, —, determination. *Gamba, P.* N. Cim. 10 (1899) 168-.
- Solids, elastic constants. *Saint-Venant, A. J. C. Barré de.* C. R. 86 (1878) 781-.
- , —, —. *Amagat, E. H.* C. R. 108 (1889) 1199-.
- , elasticity and strength. *Weisbach, J.* Civing. 9 (1863) 283-.
- , isotropic, effect of heat on modulus. *Borchardt, C. W.* Berl. Mb. (1873) 9-.
- , —, relations between elastic constants. *Voigt, W.* A. Ps. C. 38 (1889) 573-.
- Stress and strain, influence on properties of matter. *Tomlinson, H. R. S.* P. 38 (1885) 488-.
- , —, —, —, —, — (Tomlinson). *Miller, A.* A. Ps. C. 25 (1885) 450-.
- , —, —, —, —, —. *Tomlinson, H.* [1886] Phil. Trans. 177 (1887) 801-.

THREADS AND FIBRES.

- Glass, spun, tenacity. *Gibson, E., & Gregory, R. A. L.* S. P. 8 (1887) 191-; Ph. Mg. 23 (1887) 351-.
- threads, elasticity, and torsion-balances. *Ritchie, W.* Phil. Trans. (1830) 215-.
- , flexural rigidity. *Hartig, —.* Civing. 38 (1892) 265-.
- Quartz threads, absolute rigidity coefficient. *Barnett, S. J.* Ps. Rv. 6 (1898) 114-.
- , elastic constants. *Threlfall, R.* Aust. As. Rp. (1890) 363-; Ph. Mg. 30 (1890) 99-.
- , —, — (Threlfall). *Boys, C. V.* Ph. Mg. 30 (1890) 116-.
- Silk fibres, elasticity. *Quajjat, E.* St. Sp. Ag. It. 15 (1888) 739-.
- , —, *Kurz, A.* Exner Rpm. 27 (1891) 409-.
- and threads, properties, relation. *Quajjat, E.* St. Sp. Ag. It. 15 (1888) 738-.
- threads, elasticity. *Weber, W. E.* [1885] Gött. Cm. 8 (1832-37) (Ps.) 45-; Pogg. A. 34 (1835) 247-.
- Spider lines, elasticity. *Gray, J. H.* Ph. Mg. 37 (1894) 491-.
- Very fine threads, properties and uses. *Boys, C. V.* L. Ps. S. P. 9 (1888) 8-; Ph. Mg. 23 (1887) 489-.
- Wool, physical properties. *Chludzinsky, W.* Lndw. V.-St. 33 (1887) 11-.

TORSION.

(See also **Mechanics 3220 Vibrations,**
and **3630.**)

- Segnitz, E.* [1851] *Crelle J.* 43 (1852) 340-.
- Warburg, E.* [1879] *Freiburg B.* 7 (1880) 444-.
- Wiedemann, G. H. A.* *Ps. C.* 6 (1879) 485-; 7 (1879) 496.
- Baumeister, M.* [1882] *A. Ps. C.* 18 (1883) 578-.
- Bouasse, H.* *Toul. Fac. Sc. A.* 12 (1898) A, 29 pp.
- Schulz, B.* *Hann. Archt.-Vr. Z.* 45 (1899) 201-, 569-.
- Fibrous bands, torsional elasticity. *Hartig, G.* *Civing.* 36 (1890) 359-.
- Influence of after-strain and permanent set on measurements. *Negbauer, W. A.* *Ps. C.* 44 (1891) 759-.
- — — — — traction. *Cantone, M., & Michelucci, E.* *Rm. R. Ae. Linc. Rd.* 6 (1897) (*Sem.* 2) 191-.
- Iron and steel, experiments with. *Pérard, L.* *Brux. Ac. Bll.* 42 (1876) 894-; *Cuyper Rv. Un.* 6 (1879) 198-, 397-, 407-; 7 (1880) 486-.
- — — — —, torsional constants. *Peddle, W.* [1900] *Edinb. R. S. P.* 23 (1902) 16.
- Method of investigation. *Melde, F. E.* (xii) *Z. Instk.* 1 (1881) 76-.
- Modulus. *Bevan, B.* [1828] *Phil. Trans.* (1829) 127-.
- — — — —, determination for rotating shafts, application of telephone to. *Resio, C. C. R.* 90 (1880) 604-.
- — — — —, indicator for. *Resio, C. Lum.* *Elect.* 20 (1886) 433-.
- — — — — or spiral springs, ergometer for. *Jervis-Smith, F. J.* *Ph. Mg.* 45 (1898) 183-; 46 (1898) 348.
- — — — —, — — — — — (Jervis-Smith).
- Lanza, G.* *Ph. Mg.* 46 (1898) 260.
- — — — —, by self-recording apparatus. *Thurston, R. H.* (xi) *Franklin I. J.* 65 (1873) 254-.
- of homogeneous isotropic solid at given temperature. *Sayno, A.* *Mil. I. Lomb. Rd.* 24 (1891) 190-.
- Timber, experiments with. *Bouineau, —.* *Par. A. Pon. Chaus.* 1 (1861) 101-.
- Vibrations, period, measurement. *Wood, R. W. A.* *Ps. C.* 56 (1895) 171-.
- — — — —, sources of error in experiments. *Tomlinson, H. L.* *Ps. S. P.* 8 (1887) 90-; *Ph. Mg.* 22 (1886) 414-.
- Wires, modulus, and definition of "softness." *Bouasse, H.* *C. R.* 126 (1898) 466-; *A. C.* 14 (1898) 98-.
- — — — —, of oscillating wire. *Berson, G., & Bouasse, H. C. R.* 119 (1894) 48-.
- — — — —, permanent torsion, change due to change of temperature. *Bosanguet, R. H. M. L. Ps. S. P.* 9 (1888) 49-; *Ph. Mg.* 24 (1887) 160-.
- — — — —, — — — — —. *Tomlinson, H. L. Ps. S. P.* 9 (1888) 67-; *Ph. Mg.* 24 (1887) 253-.

Wires, specific resistance, dependence on tension. *Benton, J. R.* A. Ps. 3 (1900) 471-.
—, temperature, effect on modulus. *Baille, —.*
As. Fr. C. R. (1884) (*Pt.* 1) 158.

Triangular rods, experiments. *Bornemann*,
K. R. Civing. 1 (1854) 186-.

Volume in elastic bodies, variation. *Cesàro*,
E. Rm. R. Ac. Line. Rd. 5 (1889) (*Sem.* 2)
259-.

WIRES.

(See also **Torsion**, and **Mechanics** 3240.

- Garcenot, E.* St. Ét. Bll. S. In. Mn. 9 (1890) 695-; 11 (1882) 827-
Mercadier, —. Par. Éc. Pol. J. 58 (1888) 155-; C. R. 108 (1889) 344-
Scarle, G. F. C. Ph. Mg. 49 (1900) 193-
Wimperis, H. E. Ph. Mg. 50 (1900) 416-
 galvanised iron and steel, torsion and flexure.
Müller, E. Dingler 253 (1884) 454-
 iron (of suspension bridges), elasticity and cohesion.
Brix, A. F. W. Dingler 66 (1837) 334-
 —, elasticity and strength. *Giulio, C. I.* Tor. Mm. Ac. 3 (1841) 275-
 —, German and Swedish. *Käs, A.* Oestr. Z. Brgw. 36 (1888) 478-; 493-
 — under strain, effect of raising to red heat.
Tomlinson, H. L. Ps. S. P. 9 (1888) 71-; Ph. Mg. 24 (1887) 256-
 — (soft) under stress. *Ewing, J. A.* R. S. P. 30 (1880) 510-
 for ropes, modulus. *Käs, A.* Oestr. Z. Brgw. 33 (1885) 353-; 373-
 secular experiments on elasticity. *Brit. Ass. Comm.* B. A. Rp. (1879) 33-; (1880) 61-
 — — —, *Bottomley, J. T.* B. A. Rp. (1886) 537-
 stretched, lateral contraction. *Götz, H., & Kurz, A.* Exner Rpm. 22 (1886) 9-; 274-; 511-; 23 (1887) 521-
 tension. *Gounelle, E.* A. Tél. 1 (1858) 57-
 thermal expansion and contraction under tension. *Wehage, H.* Civing. 25 (1879) 619-
 — — — — —, *Bottomley, J. T.* Ph. Mg. 24 (1887) 314-
 — under tension. *Bottomley, J. T.* L. Ps. S. P. 10 (1890) 184-; Ph. Mg. 28 (1889) 94-
 — — —, *Olearski, K.* Krk. Ak. (Mt.-Prz.) Rz. 1 (1891) 166-; Cro. Ac. Sc. Bll. (1890) 139-
 — variations of elasticity and internal viscosity.
Gray, A., Blyth, V. J., & Dunlop, J. S. [1900] R. S. P. 67 (1901) 180-
 Young's modulus and change of length by magnetisation, interference method. *Shakespear, G. A.* Ph. Mg. 47 (1899) 539-
 — for piano wire, influence of heat and electric current. *Noyes, M. C.* Ps. Rv. 2 (1895) 277-

Wood, different kinds. *Hoh, T.* (xii) Bamb.
Nf. Gs. B. (11) (1876) (*Pt. 1, No. 3*) 17 pp.
Zinc, elasticity at different temperatures.
Zimansky, E. A. Ps. C. 54 (1895) 139-.

0842 Compressibility of Liquids.

- Colladon, D., & Sturm, C.* [1827] *Par. Mm.*
Sav. Étr. 5 (1838) 267-.
- (*Colladon & Sturm.*) *Barlocci, S.* *G. Arcad.*
 36 (1827) 308-.
- Ørsted, H. C.* *Kiøb. Ov.* (1827-28) 14-; *Pogg.*
A. 12 (1828) 158-.
- Aimé, G. C. R.* 16 (1843) 1165-; *A. C.* 8
 (1843) 257-.
- Despretz, C. C. R.* 21 (1845) 216-.
- Grassi, C. C. R.* 27 (1848) 153-.
- Soret, J. L.* *Bb. Un. Arch.* 16 (1851) 290-.
- Chase, P. E.* *Camb. (U.S.) Mth. M.* 2 (1860) 25-.
- Jamin, —, Amaury, —, & Descamps, C. C. R.*
 66 (1868) 1104-.
- (Method of Jamin, Amaury and Descamps.)
Dupré, A. C. R. 67 (1868) 392-.
- Amaury, —, & Descamps, —. C. R.* 68 (1869)
 1564-.
- Descamps, C. Rv. Cours Sc.* 3 (1872) 21-.
- Amagat, E. H. C. R.* 85 (1877) 27-, 139-;
A. C. 11 (1877) 520-.
- Avenarius, M. St. Pét. Ac. Sc. Bll.* 24 (1878)
 525-.
- Quincke, G. H. A. Ps. C.* 19 (1883) 401-.
- Pagliani, S., & Palazzo, L. Rm. R. Ac. Linc.*
Mm. 19 (1884) 273-.
- Pagliani, S., & Vicentini, G. N. Cim.* 16
 (1884) 27-, 161-.
- Guillaume, C. É. C. R.* 103 (1886) 1183-.
- Langlois, M. As. Fr. C. R.* (1887) (*Pt.* 2) 334-.
- Puschl, C. Wien Ak. Sb.* 96 (1888) (*Ab.* 2)
 1028-.
- Barus, C. U. S. Gl. Sv. Bll. No.* 92 (1892) 96 pp.
- Tait, —. Edinb. R. S. P.* 20 (1895) 245-.
- Compressibility at high pressures. *Cailletet,*
L. C. R. 75 (1872) 77-.
- — — *Tait, P. G.* [1883] *Edinb. R.*
S. P. 12 (1884) 223-.
- — — temperatures. *Ørsted, H. C.* [1826]
Edinb. J. Sc. 6 (1827) 201-.
- and molecular pressure of liquids. *Tait,*
P. G. Edinb. R. S. P. 20 (1895) 63-, 141-.
- — surface tension of liquids. *Devauz, —.*
 [1892] *Bordeaux S. Sc. Mm.* 4 (1894) ii-.
- Compression, thermal effects (water). *Ørsted,*
H. C. Kiøb. Dn. Vd. Selsk. Afh. 12 (1846)
 cxiv-.
- — — *Joule, J. P.* [1858] *Phil. Trans.*
 (1859) 133-.
- — — *Puschl, P. C. Wien Az.* 25 (1889)
 123-.
- — — (water). *Galopin, P. C. R.* 114
 (1892) 1525-.
- — — (—). *Tait, —. Edinb. R. S. P.* 19
 (1893) 133-.
- — — (solutions). *Tammann, G. Z. Ps.*
C. 13 (1894) 174-.
- Equation of van der Waals, application. *Tait,*
—. Edinb. R. S. P. 20 (1895) 285-.
- Influence of temperature. *Heen, P. de. Brux.*
Ac. Bll. 9 (1885) 550-.
- Laws. *Amagat, E. H. C. R.* 115 (1892) 638-.
- *Tumlirz, O. Wien Ak. Sb.* 109 (1900)
 (*Ab.* 2a) 837-.

MEASUREMENT OF COMPRESSIBILITY.

- Amagat, E. H. Arch. Sc. Ps. Nt.* 16 (1886)
 181-.
- Tait, —. Edinb. R. S. P.* 13 (1886) 2-.
- apparatus (for water, piezometer). *Perkins, J.*
Phil. Trans. (1820) 324-.
- (—). *Ørsted, H. C. Kiøb. Ov.* (1821-
 22) 6-; *Schweigger J.* 36 (= *Jb.* 6) (1822)
 332-.
- *Pfaff, C. H. Gilbert A.* 72 (1822) 161-.
- (for water, Ørsted). *Hachette, J. N. P.*
Par. S. Phlm. Bll. (1823) 46-.
- (—). *Ørsted, H. C. (vi Add.) Mg.*
Phm. 2 (1823) 139-.
- (— —). *Magrini, L. Mil. At.*
Aten. 2 (16) (1860-61) 58-.
- (piezometer). *Mees, R. A. Amst. Ak. Vs.*
M. 19 (1884) 137-.
- *Skinner, S.* [1891] *L. Ps. S. P.* 11
 (1892) 147-; *Ph Mg.* 32 (1891) 79-.
- (isentropic and isothermal compressibility
 of liquids and solids). *Guglielmo, G. Rm.*
R. Ac. Linc. Rd. 1 (1892) (*Sem.* 1) 149-.
- (piezometer to compress and extend liquids).
Pizzarello, A. N. Cim. 8 (1898) 266-.
- and dilatation. *Amagat, E. H. C. R.* 111
 (1890) 871-.
- eliminating volume-change of containing
 vessel. *Guillaume, C. É. Arch. Sc. Ps.*
Nt. 17 (1887) 177-.
- — — — *Boguski, J. J. Kosmos*
 (Lw.) 13 (1888) 243-; *Z. Ps. C.* 2 (1888)
 120-.
- influence of heat of compression. *Röntgen,*
W. C. A. Ps. C. 45 (1892) 560-.
- Jamin's method, using Regnault's manometer.
Mees, R. A. Amst. Ak. Vs. M. 14 (1879)
 108-; 15 (1880) 218-.

VARIOUS LIQUIDS.

- Ammonium chloride solutions. *Braun, F.*
A. Ps. C. 31 (1887) 331-.
- Aqueous chloride solutions. *Schumann, M.*
A. Ps. C. 31 (1887) 14-.
- Ethyl alcohol, volume-extensibility. *Worth-*
ington, A. M. [1892] *Phil. Trans. (A)* 183
 (1893) 355-.
- Hydrocarbons. *Elenev, A. S. (xii) Rs. C.*
Ps. S. J. 5 (*Pt.* 1) (1873) 109-.
- *Bartoli, A. Mil. I. Lomb. Rd.* 28 (1895)
 1141-.
- and alcohols, compressibility, tension co-
 efficients and specific heats. *Pagliani, S.*
Rm. R. Ac. Linc. Rd. 5 (1889) (*Sem.* 1)
 885-.
- Mercury. *Langlois, M. C. R.* 103 (1886)
 1009-.
- , compressibility, and elasticity of glass.
Amagat, E. H. C. R. 108 (1889) 228-.
- — — — solids. *Amagat, E. H. J. de*
Ps. 8 (1889) 197-, 359-; *A. C.* 22 (1891) 95-;
Par. S. Ps. Sé. (1891) 102-.

0842 Liquids, Compressibility

- Mercury, and glass. *Metz, G. de.* [1890] N. Rs. S. Nt. Mm. (*Mth.*) 13 (1891) 109-; A. Ps. C. 47 (1892) 706-.
- Oils and colloids. *Metz, G. G. de.* Rs. Ps.-C. S. J. 22 (*Ps.*) (1890) 126-; A. Ps. C. 41 (1890) 663-.
- Organic liquids. *Röntgen, W. C.* A. Ps. C. 44 (1891) 1-.
- Potassium and calcium chlorides, solutions. *Drecker, J. A.* Ps. C. 34 (1888) 952-.
- Saline solutions. *Schneider, J.* Giessen Oberh. Gs. B. 25 (1887) 1-.
- , *Gilbault, H.* C. R. 114 (1892) 209-.
- , dilute, and solid sodium chloride. *Röntgen, W. C., & Schneider, J.* A. Ps. C. 31 (1887) 1000-.
- Solutions. *Gilbault, H.* Toul. Fac. Sc. A. 11 (1897) B, 63 pp.
- , compressibility, relation to that of constituents. *Braun, F. A.* Ps. C. 32 (1887) 504-.
- Sugar solutions. *Tait, —.* Edinb. R. S. P. 22 (1900) 359-.
- Sylvin, rock salt, and potassium chloride solutions. *Röntgen, W. C., & Schneider, J.* A. Ps. C. 34 (1888) 531-.

Water.

- Örsted, H. C.* Kiøb. Ov. (1817-18) 11-; Schweigger J. 21 (1817) 348-.
- Perkins, J.* Phil. Trans. (1820) 324-.
- (Perkins.) *Deuchar, J.* Tilloch Ph. Mg. 58 (1821) 201-.
- (—) *Roget, P. M.* Thomson A. Ph. 1 (1821) 135.
- (— and Örsted.) *Barlocci, S. G.* Arcad. 20 (1823) 338-.
- Clement, —.* Par. S. Phlm. Bil. (1823) 28-.
- Örsted, H. C.* A. C. 38 (1828) 326-; Kiøb. Ov. (1832-33) 16-; Pogg. A. 31 (1834) 361-; B. A. Rp. (1833) 353-.
- Rankine, W. J. M.* Edinb. R. S. P. 3 (1857) 58-.
- Anderssohn, A.* D. Nf. Tbl. (*1868) 95-.
- Tait, P. G.* [1882] Edinb. R. S. P. 12 (1884) 45-.
- Pagliani, S., & Vicentini, G.* (xii) Rv. Sc.-Ind. 15 (1883) 282; N. Cim. 16 (1884) 27-; 161-.
- Tait, P. G.* Edinb. R. S. P. 12 (1884) 757-.
- Langlois, M.* C. R. 102 (1886) 1451-.
- Amagat, E. H.* C. R. 104 (1887) 1159-.
- Röntgen, W. C., & Schneider, J.* A. Ps. C. 33 (1888) 644-.
- Amagat, E. H.* C. R. 116 (1893) 41-; Par. S. Ps. Sé. (1893) 145-.
- and alcoholic mixtures. *Pagliani, S.* Rm. R. Ac. Linc. Rd. 5 (1889) (*Sem.* 1) 777-; 937.
- compressibility and elasticity. *Araldi, M.* Bologna Mm. I. It. 2 (1898) 327-.
- , practical applications. *Forbes, J. D.* Edinb. N. Ph. J. 19 (1835) 36-.
- ; and thermoelectricity. *Örsted, H. C.* Par. S. Phlm. Bil. (1823) 45-.
- compression bathometer. *Regnard, P.* Par. S. Bl. Mm. 45 (1893) (*C. R.*) 6-.

Values of Densities 0845

- compression, progressive. *Perkins, J.* Phil. Trans. (1826) 541-.
- , theoretical rule. *Mac Kain, D.* Glasg. P. Ph. S. 1 (1841-44) 249-.
- elasticity. *Busse, F. G. von.* Gilbert A. 20 (1805) 504-.
- , mechanical effects. *Mensbrughe, G. van der.* Rv. Quest. Sc. 45 (1899) 580-.
- and ether. *Amagat, E. H.* C. R. 103 (1886) 429-.
- ethyl alcohol mixtures. *Pagliani, S., & Palazzo, L.* Tor. Ac. Sc. At. 19 (*1883) 1017-.
- at high temperature. *Barus, C.* Am. J. Sc. 41 (1891) 110-.
- incompressibility. *Anderssohn, A.* D. Nf. Tbl. (*1868) 95-.
- and paratoluidine. *Hulett, G. A.* Z. Ps. C. 33 (1900) 237-.
- salt solutions. *Tait, —.* Edinb. R. S. P. 15 (1889) 84.
- at different temperatures. *Rankine, W. J. M.* Ph. Mg. 1 (1851) 548-.

0845 Numerical Values of Mechanical Quantities (Density, Gravitation, etc.).

DENSITY.

(See also Chemistry 7115.)

- Air. *Agamennone, G.* Rm. R. Ac. Linc. Rd. 1 (1885) 111-.
- , liquid, and its components. *Wroblewski, S.* C. R. 102 (1886) 1010-.
- , —, — other liquefied gases. *Ladenburg, A., & Krügel, C.* Berl. B. 32 (1899) 46-, 1415-.
- Alcohol, pure. *Pierre, J. I.* C. R. 76 (1873) 336-.
- , table for dilution. *Anon.* Manch. Mer. S. T. (1891) 74.
- Alloys, change in volume density. *Kosmann, B.* Berg.-Hm. Ztg. 54 (1895) 51-.
- Animal substances. *Kapff, —, & Schübler, —.* Erdm. J. Tech. C. 14 (1832) 89-.
- Argon and helium, density, refractivity and viscosity. *Rayleigh, (Lord).* R. S. P. 59 (1896) 198-.
- Bismuth, fused. *Roberts-Austen, W. C., & Wrightson, T. L.* Ps. S. P. 4 (1881) 195-; Ph. Mg. 11 (1881) 295-.
- , —, anomalous densities. *Luedekeing, C.* St. Louis Ac. T. 5 (1892) 292-.
- Brass, zinc, copper and iron, homogeneity. *Hennig, R. A.* Ps. C. 27 (1886) 321-; 28 (1886) 696.
- Cæsium. *Menke, A. E.* Am. C. S. J. 21 (1899) 420-.
- Calcium sulphate. *McCaleb, J. F.* Am. C. J. 11 (1889) 35-.
- Carbon dioxide, solid and liquid. *Behn, U.* A. Ps. 3 (1900) 733-.
- Carbonic oxide, carbonic anhydride and nitrous oxide. *Rayleigh, (Lord).* R. S. P. 62 (1898) 204-.

Chlorine and hydrochloric acid, density and molecular volume. *Leduc, A.* C. R. 116 (1893) 968-.

Coke. *Tilden, W. A.* S. C. In. J. 3 (1884) 610-.

Dilute aqueous solutions. *Kohlrausch, F., & Hallwachs, W.* Gött. Nr. (1893) 350-; A. Ps. C. 53 (1894) 14-, 1092.

Earth and body consisting of all known elements, comparison of densities. *Bartoli, A.* Rm. R. Ac. Linc. Rd. 1 (1885) 596-.

— — — — — *Tolomei, G.* [1897] Ven. I. At. (1897-98) 214-.

Ebonite. *Campanile, F.* Nap. Rd. 33 (1894) 63-.

Ether, aqueous solutions, temperature of maximum density. *Nort, H.* Mbl. Nt. (1895-96) 79-; Fsch. Ps. (1896) (Ab. 2) 250.

—, carbon disulphide and alcohol, liquid. *Battelli, A.* [1895] Tor. Ac. Sc. Mm. 45 (1896) 235-.

—, — — — — — (Battelli). *Mathias, —.* As. Fr. C. R. (1898) (Pt. 2) 172-; N. Cim. 9 (1899) 327-.

Ethyl alcohol, aqueous solutions. *Mendelëeff, D.* C. S. J. 51 (1887) 778-.

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Gases at atmospheric pressure, density and molecular volume. *Leduc, A.* C. R. 125 (1897) 703-.

—; and composition of air. *Leduc, A.* C. R. 126 (1898) 413-.

—; — — — — — water. *Leduc, A.* C. R. 116 (1893) 1248-.

—, influence of moisture. *Thomson, T.* Thomson A. Ph. 3 (1822) 302-.

—, — — — — — *Apjohn, Jas.* Thomson A. Ph. 3 (1822) 385-; 4 (1822) 195-.

—, — — — — — *Herapath, J.* Thomson A. Ph. 3 (1822) 419-.

—, — — — — — *Sylvester, C.* Thomson A. Ph. 4 (1822) 29-, 360.

— mixed with vapour. *Herapath, J.* Thomson A. Ph. 12 (1826) 97-.

—, principal. *Rayleigh, (Lord).* R. S. P. 53 (1893) 134-.

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Germanium and titanium, vapour density. *Nilson, L. F., & Pettersson, O.* Z. Ps. C. 1 (1887) 27-.

Gold. *Hatchett, C.* Phil. Trans. (1803) 43-.

— and silver coinage. *Broch, O. J.* As. Fr. C. R. 9 (1880) 358-.

Human body and sea-water, comparative gravity. *Spencer, K.* Tilloch Ph. Mg. 46 (1815) 248-.

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— (Rainy). *Thomson, T.* Thomson A. Ph. 10 (1825) 352-.

— *Rainy, H.* Thomson A. Ph. 11 (1826) 187-.

— *Staciewicz, T.* Phm. Z. Russl. 23 (1884) 65-, 95.

— desiccated by liquid air. *Rayleigh, (Lord).* R. S. P. 66 (1900) 334-.

Hydrogen and oxygen. *Morley, E. W.* [1895] Smiths. Ct. 29 (1903) Art. II, 117 pp.

— — — — — *Thomsen, J.* Z. Anorg. C. 12 (1896) 1-.

— — — — —, relative densities. *Rayleigh, (Lord).* R. S. P. 43 (1888) 356-; 50 (1892) 448-.

Iron and antimony alloys, density and specific heat. *Laborde, J.* C. R. 123 (1896) 227-.

— — nickel alloys. *Hopkinson, J.* R. S. P. 50 (1892) 121-.

Isomorphous mixtures. *Retgers, J. W.* Z. Ps. C. 3 (1889) 497-.

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— *Streng, A.* Berg-Hm. Ztg. 20 (1861) 225-.

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Liquids. *Nobile, A.* [1829] Nap. At. I. Inc. 5 (1834) 79-.

— of very high density. *Platz, —.* [1884] Karlsruhe Nt. Vr. Vh. 10 (1888) (Sb.) 42.

Mean density. *Ure, Andr.* QJ. Sc. 4 (1818) 151-.

Mercury. *Stewart, B.* [1866] R. S. P. 15 (1867) 10-.

—, solid. *Tardy de la Brosse, —.* Bb. Brit. 30 (1805) 275-.

—, — *Biddle, J.* Gilbert A. 24 (1806) 385-.

—, — *Mallet, J. W.* [1877] R. S. P. 26 (1878) 71-.

— and water. *Guillaume, C. É.* [1900] Sc. Abs. 4 (1901) 475-.

Muddy liquids and nebulous gases. *Garcia de la Cruz, D. V.* Rv. Sc. 3 (1895) 272-.

Nitrogen. *Rayleigh, (Lord).* Nt. 46 (1892) 512-.

—, anomaly in density. *Rayleigh, (Lord).* R. S. P. 55 (1894) 340-.

—, atmospheric, and pure nitrogen and argon. *Ramsay, W.* R. S. P. 64 (1899) 181-.

— dioxide. *Leduc, A.* C. R. 116 (1893) 322-.

Nitrous oxide, ethylene and carbonic anhydride, liquefied, and their saturated vapours. *Caillaet, L., & Mathias, —.* C. R. 102 (1886) 1202-.

Oxygen, liquid. *Offret, J.* A. C. 19 (1880) 271-.

—, — *Wroblewski, S. von.* A. Ps. C. 20 (1883) 860-.

—, —, density and coefficient of expansion. *Olszewski, K.* [1883] (xm) Krk. Ak. (Mt.-Prz.) Rz. & Sp. 11 (1884) 11-.

— and nitrogen and argon; and composition of air. *Leduc, A.* C. R. 123 (1896) 805-.

— — — — —; composition of air. *Leduc, A.* J. de Ps. 10 (1891) 37-.

— — — — — hydrogen. *Leduc, A.* C. R. 113 (1891) 186-.

— — — — —; and composition of air. *Leduc, A.* J. de Ps. 1 (1892) 231-.

— — — — —, liquefied. *Caillaet, L., & Hautefeuille, P.* C. R. 92 (1881) 1086-.

— — — — — methane, liquefied. *Olszewski, K.* Krk. Ak. (Mt.-Prz.) Rz. 14 (1886) 181-, 197-; A. Ps. C. 31 (1887) 58-.

Phosphorus vapour. *Dumas, J. B.* A. C. 49 (1832) 210-.

Platinum. *Hess, H.* St. Pét. Ac. Sc. Mm. 1 (1831) 587-.

Platinum, iridium, and platinum-iridium, physical properties. *Stas*, —. *Par. Poids et Mes.* PV. (*1877) 6—.

— metals and alloys, densities and expansions. *Broch*, O. J. *Par. Poids et Mes.* PV. (*1877) 209—.

Saline solutions. *Gerosa*, G. G., & *Mai*, E. *Rm. R. Ac. Linc. Mm.* 4 (1887) 134—.

Salts, various. *Clarke*, F. W. *Am. J. Sc.* 16 (1878) 199—; *Berl. B.* 12 (1879) 1398—; *Am. C. J.* 5 (1883–84) 240—.

Selenium. *Schaffgotsch*, F. von. *Berl. B.* (1847) 422—; *Pogg.* A. 90 (1853) 66—.

Soda and potash, solutions. *Pickering*, S. U. *Ph. Mg.* 37 (1894) 359—.

Sodium chloride, pure. *Unger*, U. von. *Erdm. J. Pr. C.* 8 (1836) 294—.

Solids, densities, influence of state of division. *Schiff*, H. C. *Ztg.* 10 (1886) 430.

— and liquids. *Clarke*, F. W. [1873] (ix) *Smiths. Misc. Col.* 12 (1874) *Art.* 2, 272 pp.; 32 (1888) *Art.* 1, xi+409 pp.

Steam. *Tralles*, J. G. *Gilbert A.* 27 (1807) 400—.

— *Schmedding*, G. J. *Pogg.* A. 27 (1833) 40—.

— *Rankine*, W. J. M. *Glasg. T. I. Eng.* 3 (1859–60) 53—.

— *Schmidt*, G. *Dingler* 160 (1861) 262—.

— *Rankine*, W. J. M. [1862] (viii) *Edinb. R. S. T.* 23 (1864) 147—.

Steel, effect of tempering. *Fromme*, C. A. *Ps. C.* 8 (1879) 352—.

—, homogeneity. *Gruner*, P. A. *Ps. C.* 41 (1890) 334—.

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Sulphur vapour. *Biltz*, —. *Nt.* 38 (1888) 229.

— *Schall*, C. *Berl. B.* 33 (1900) 484—.

—, and progressive dissociation. *Riecke*, E. *Z. Ps. C.* 6 (1890) 430—.

Sulphuric acid, concentrated. *Kohlrausch*, W. F. A. *Ps. C.* 17 (1882) 69—.

—, dilute, density and composition. *Rücker*, A. W. *Ph. Mg.* 32 (1891) 304—; 33 (1892) 204—.

— solutions. *Pickering*, S. U. *Ph. Mg.* 33 (1892) 132—.

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— — — *Bott*, W. B. A. *Rp.* (1888) 632—.

— — — *Scott*, A. *Edinb.-R. S. P.* 14 (1888) 410—.

—, saturated, and liquefied gases. *Cailletet*, L., & *Mathias*, E. J. *de Ps.* 5 (1886) 549—.

Wood, various kinds. *Karmarsch*, K. *Wien Jb. Pol. I.* 18 (1834) 120—.

Woods, principal industrial. *Filippo*, P. *Mil. S. It. At.* 25 (1882) 105—.

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0900 General.

Perego, A. *Brescia Cm.* (1816–17) 58—.

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— hypothesis. *Girard de Caudenberg*, —. *Bordeaux Ac. Sc. Sé. Pbl.* (1831) 36.

—, leading doctrines. *Ure*, *Andr.* *Phil. Trans.* (1818) 338—.

—, mode of action. *Prevost*, P. *Bb. Brit.* 26 (1804) 205—, 309—.

— and molecular mechanics. *Girard de Caudenberg*, —. *Dijon Ac. Mm.* (1830) 5—, (livr. 2) 3—.

—, received doctrines. *Tilloch*, A. [1799] *Tilloch Ph. Mg.* 8 (1800) 70—, 119—, 211—.

— of vacuum. *Gay-Lussac*, L. J. A. C. 13 (1820) 304—.

Heat, action on bodies, importance of study. *Cantoni*, G. *Rm. R. Ac. Linc. Rd.* 7 (1891) (Sem. 2) 438—.

—, early history. *Rodwell*, G. F. C. N. 20 (1869) 184—.

—, experiments, reflexions derived from. *Wünsch*, (Prof.) —. *Gilbert A.* 26 (1807) 289—.

—, nature. P., —. *Tilloch Ph. Mg.* 12 (1802) 317—.

—, ponderability. *Rumford*, B. (Count). *Phil. Trans.* (1799) 179—.

—, —. *Hombres-Firmas*, L. A. d'. *Gard Not. Tr. Ac.* (1811) 138—.

—, —. *Moscatti*, P. *Bb. Brit.* 46 (1811) 405—.

—, —. *Tarbé de St. Hardouin*, —. *Reims A. Ac.* 1 (1843) 257—.

—, synthesis. *Pictet*, R. *Arch. Sc. Ps. Nt.* 2 (1879) 460—.

—, theory. *Ostrogradsky*, M. A. [1829] *St. Pét. Ac. Sc. Mm.* 1 (1831) 123—, 129—.

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—, —, and applications to arts and manufactures. *MacDonnell*, A. [1873] *Dubl. S. J.* 6 (1875) 494—.

—, —, Regnault's experiments. *Bosscha*, J. *Amst. Ak. Vs.* [I] (1893) 180—.

Imponderables, theory. *Bellavitis*, G. *Ven. I. At.* 1 (1874–75) 495—.

—, — (Bellavitis). *Rossetti*, F. *Ven. I. At.* 1 (1874–75) 779—.

Physical and chemical phenomena at low temperatures. *Pictet*, R. C. R. 114 (1892) 1245—.

Temperature of lava erupted by Etna. *Bartoli*, A. *Catania Ac. Gioen. Bil.* 29 (1892) 2—; *Mil. I. Lomb. Rd.* 29 (1896) 363—.

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1000 General.

- Calorific power of some solid combustibles, determined by calorimeters of Mahler and Thompson. *Cavazzi, A., & Baroni, G.* [1895] Bologna Ac. Sc. Mm. 6 (1896-97) 217- or 137-.
- value of fuels, steam boiler tests as means of determining. *Robb, D. W.* [1890] N. Scotia I. Sc. P. & T. 8 (1895) 9-.
- Cold. *Payer, J.* [1875] Wien Vr. Nw. Kennt. Schr. 16 (1876) 131-.
- Combustion, experiments and views. *Grotthus, T. von. Schweigger J. 9* (1813) 327-.
- Fire by compression of air. *Accum, F. Tilloch Ph. Mg. 31* (1808) 130-.
- making, methods. *Hough, W. Smiths. Rp.* (1890) (*U. S. Nat. Ms. Rp.*) 395-.
- Flame contact and heating of water. *Fletcher, T. Nt. 34* (1886) 230-.
- Fuel, economic use on scientific principles. *Precht, J. J. Haarl. Ntk. Vh. Mtsch. 3* (1806) 1-.
- Heat developed by friction. *Becquerel, A. C. C. R. 7* (1838) 363-; *Par. Mm. de l'I. 17* (1840) 181-.
- — — *Hirn, G. A., & Séguin, —. Moigno Cosmos 6* (1855) 679-.
- — — between liquids and solids. *Maschke, O. A. Ps. C. 146* (1872) 431-.

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- Pouillet, C. S. M. A. C. 20* (1822) 141-.
- Fibrous substances. *Cobbett, L. Camb. Ph. S. P. 10* (1900) 372-.
- Porous solids. *Cantoni, G. Mil. I. Lomb. Rd. 3* (1866) 135-.
- Powders. *Meissner, F. A. Ps. C. 29* (1886) 114-.
- *Martini, T. Ven. I. At.* (1896-97) 502-.
- *Lagergren, S.* [1898] Stockh. Ak. Hndl. Bh. 24 (*Afd. 2*) (1899) No. 5, 14 pp.
- *Martini, T. Ven. I. At.* (1897-98) 927-.
- *Ercolini, G. N. Cim. 9* (1899) 110-.
- (Ercolini). *Martini, T. N. Cim. 9* (1899) 334-.
- (Martini). *Ercolini, G. N. Cim. 9* (1899) 446-.
- (Ercolini). *Martini, T. N. Cim. 10* (1899) 42.
- *Martini, T. Ven. I. At.* (1899-1900) (*Pt. 2*) 615-.
- *Bellati, M. Ven. I. At.* (1899-1900) (*Pt. 2*) 931-.

- Heat equivalent of fossil combustibles, industrial apparatus for. *Magnanini, G., & Zunino, V. Mod. Ac. Sc. Mm. 2* (1900) 117-.
- excited by solar rays. *Rumford, B. (Count).* [1805] *Par. Mm. de l'I. 6* (1806) 123-; *Gilbert A. 20* (1805) 177-.
- , generation. *Örsted, H. C.] Schweigger J. 5* (1812) 401-.

- Heat as introduction to study of temperature. *Hauvel, —. Fr. S. Mét. An. 44* (1896) 139-.
- and light, new means of producing. *Sullivan, J. L. Silliman J. 1* (1818) 91-.
- — —, production by compression. *Hombres-Firmas, L. A. d'. Gard Not. Tr. Ac.* (1811) 175-.
- produced by blast of air from bellows. *Winter, R. Nicholson J. 13* (1806) 72-.
- — — — — *D., K. H. (vi Adds.) Nicholson J. 13* (1806) 170-.
- — — compression of air. *Bellani, A. Poligrafo 10* (1832) 321-.
- — with platinum black. *Bellani, A. Poligrafo 10* (1832) 321-.
- , sources. *Knoblauch, H. Pogg. A. 71* (1847) 58-.
- , —, natural and artificial. *Daubrée, A. Par. S. Gl. Bll. 4* (1846-47) 1056-.
- Ice caverns of Naye, Switzerland, origin of ice. *Dutoit, —, & Blanc, V. L. Laus. S. Vd. Bll. 32* (1896) xxx-.
- Magnetism, direct production of heat by. *Grove, W. R. R. S. P. 5* (1849) 826-.
- Petroleum as source of power. *Clark, N. B. Franklin I. J. 117* (1884) 341-.
- Regeneration of heating gas ovens. *Hennecart, —. [1883] St. Ét. Bll. S. In. Mn. 13* (*1884) 198-.
- Sensible temperature. *Prinsep, J. Gleanings Sc. 2* (1830) 137-.
- Ships' boilers, new method of closing in. *Sjösten, C. J. Stockh. Ak. Hndl. 27* (1806) 94-.
- Solar heat, applications. *Ligin, V. N. Rs. S. Nt. Mm. (Mth.) 4* (*1883).
- — —, mechanical effect on confined air. *Mouchot, —. C. R. 59* (1864) 527.
- —, use as motive force. *Harro, A. Nancy S. Sc. Bll. 3* (10^e Ann.) (1877) 91-.
- — —, with plane reflector. *Güntner, C. [1875] Wien Ak. Sb. 72* (1876) (*Ab. 2*) 713-.
- —, — to replace fuel in certain countries. *Mouchot, —. C. R. 67* (1868) 1182-.
- Temperature in flames. *Mache, H. Wien Ak. Sb. 108* (1899) (*Ab. 2a*) 1152-.
- Terrestrial heat, cause determining reproduction. *Ponte, S. C. [1880] Catania Ac. Gioen. At. 15* (1881) 27-.
- Trials by fire, etc., apparatus for. *Rochas d'Aiglm, É. A. A. de. Rv. Sc. 4* (1882) 344-.
- Tyndall's "Lectures on Force and Heat," passage in. *Heath, D. D. Ph. Mg. 25* (1863) 531-.

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- Debray, H. Presse Sc. 1* (1863) 59-.
- Goldschmidt, H. [1898-99] Z. Angew. C. (1898) 821-; Z. Elektch. (1899-1900) 53-.*
- Lange, E. F. I. & S. I. J. (1900) No. 2* 191-.

- Aluminium, combustion. *Goldschmidt, H. Z. Elektch.* (1897-98) 494-; *Z. Angew. C.* (1900) 919-.
- Apparatus for maintaining incandescence of platinum in water. *Paquelin, —. C. R.* 113 (1891) 384-.
- rendering surgical instrument incandescent. *Bay, —. C. R.* 113 (1891) 298-.
- Blast-furnace, theory of use of hot air. *Valérius, H. Brux. Ac. Bll.* 39 (1875) 370-.
- Blow-pipe, new form. *Paquelin, —. C. R.* 113 (1891) 303-.
- Bunsen flame, constitution. *Terquem, A. Par. S. Ps. Sé.* (1880) 189-.
- and monochromatic burners. *Terquem, A. C. R.* 90 (1880) 1484-.
- Calorificator, Ougrimoff electric. *Montpellier, J. A.* [1900] *Sc. Abs.* 4 (1901) 92-.
- Central heating, Bamberg. *Hoh, T. (xii) Bamb. Nf. Gs. B.* (11) (1876) (Pt. 1, No. 2) 16 pp.
- Chimneys, utilisation of heat in. *Edelcrantz, A. N. Stockh. Ak. Hndl.* 33 (1812) 24-.
- Dense atmosphere, production of high temperature in. *Cailletet, L. C. R.* 106 (1888) 333-.
- Fireplaces, etc. *Fourmy, —. J. de Ps.* 84 (1817) 406-.
- , domestic, perfecting. *Forestier, C. Toul. Ac. Sc. Mm.* 7 (1875) 233-.
- and field cooking apparatus. *Sjöstén, G. J. Stockh. Ak. Hndl.* 28 (1807) 235-.
- used in barracks and hospitals, England. *Morin, A. J. C. R.* 59 (1864) 921-.
- Furnace, construction, use of incombustible material. *Haase, F. H. Dingler* 294 (1894) 13-, 232-.
- , dimensions of air passages. *Langlade, — de. A. Mines* 8 (1885) 172-.
- , gas, new laboratory. *Rössler, H. Cztg. Opt.* 6 (1885) 53.
- , —, Ponsard's. *Périssé, J. S. Par. Ing. Civ. Mm.* (1874) 752-.
- , —, and regenerated heat. *Krans, F. A. Gén. Civ.* 3 (1874) 36-, 101-, 162-, 316-, 514-.
- , —, regeneration of heat. *Boischevalier, A. de. Gén. Civ.* 3 (*1882-83) 122-.
- , —, Siemens's. *Damour, E. A. Mines* 3 (1893) 84-.
- , —, regenerative, use of peat in. *Mac Donnell, A.* [1874] *Dubl. S. J.* 6 (1875) 503-.
- , —, temperature. *Périssé, J. S. Cuyper Rv. Un.* 38 (1875) 269-.
- , —, use of peat in, Motala, Sweden. *Sebenius, J. L. Jern-Kont. A.* 31 (1876) 227-.
- Gas and electricity as heatingagents. *Siemens, (Sir) C. W. Nt.* 23 (1881) 326-, 351-.
- , illuminating, as fuel. *Baer, W. Halle Z.* 3 (1854) 380-, 471-.
- stoves, improvements. *Adams, J. Glasg. Ph. S. P.* 12 (1880) 190-.
- supply for heating and illumination. *Siemens, (Sir) C. W. Nt.* 24 (1881) 153-.
- Goldschmidt's experiments. *Zehenter, J. Innsb. Nt. Md. B.* 25 (1900) xii-.
- Heat, production and industrial utilisation. *Gautier, F.* [1883] *Gén. Civ.* 4 (*1883-84) 90-.
- Heat, production and industrial utilisation. *Damour, E., & Waton, —. Gén. Civ.* 31 (1897) 66-, 115-.
- , —, —. *Damour, E. Gén. Civ.* 31 (1897) 324-, 405-, 417-; 32 (1897-98) 4-, 22-, 46-; 33 (1898) 108-.
- ; utilisation in furnaces. *Damour, E. A. Cons. Arts et Mét.* 1 (1899) 51-.
- Heating apparatus (Pimont). *Boutan, A. Rouen Tr. Ac.* (1850-51) 72-.
- High temperature furnace. *Gantt, H. L. Franklin I. J.* 142 (1896) 458-.
- Hygrothermant for heating wine out of contact with air. *Balló, M. Mth. Term. Ets.* 3 (1885) 221-; *Mth. Nt. B. Ung.* 3 (1884-85) 255-.
- Intense heat from gas. *Brewster, (Sir) D.* [1826] *Edinb. J. Sc.* 1 (1829) 104-.
- Lenses and mirrors for burning instruments and lighthouses. *Brewster, (Sir) D.* [1823-27] *Edinb. Ph. J.* 8 (1823) 160-; *Edinb. R. S. T.* 11 (1831) 33-.
- Producer-gas, formation. *Akerman, R. Jern-Kont. A.* 46 (1891) 321-; *Berg-Hm. Jb.* 40 (1892) 81-.
- Ship stove, improved. *Collier, J. Tilloch Ph. Mg.* 32 (1808) 119-.
- Steam, communication of heat by. *Potts, C. Franklin I. J.* 5 (1830) 395-.
- , exhaust, waste heat utilisation. *Atkinson, J.* [1878] *Eng. S. T.* (1879) 167-.
- heating. *A., L. S. M. A. das Sc.* 12 (1821) 52-.
- , —, avoidance of loss of steam. *Scheeffer, A. Berl. Pol. Ga. Vh.* 17 (1856) 124-.
- of liquids. *Gueymard, É. A. Mines* 5 (1829) 353-.
- Stoves for rooms, improvement. *Chauvin, E. As. Fr. C. R.* 12 (1883) 240-.
- Temperature, extremes, mechanical production. *Solvay, E. C. R.* 121 (1895) 1141-.
- , —, —. *Cailletet, —. C. R.* 121 (1895) 1143-.
- , —, —. *Solvay, E. C. R.* 122 (1896) 99-.
- limits. *Walden, P. Riga Cor.-Bl.* 39 (1896) 83-.
- , photographic means of recording. *Roberts-Austen, W. C. Phot. J.* 20 (1896) 225-.
- and pressure variables, long range. *Barus, C. Am. As. P.* (1897) 65-.
- of rooms. *Meidinger, —. [1896] Karlsruhe Nt. Vr. Vh.* 13 (1900) (Sb.) 30-.
- Thermolamps for houses, manufactories, etc. *Kretschmar, —. Gilbert A.* 13 (1803) 498-; 22 (1806) 85-.
- and their first inventor. *Gilbert, L. W. Gilbert A.* 22 (1806) 51-.
- Warming apparatus. *Pictet, M. A. Bb. Un.* 6 (1817) 166-.
- , theory. *Boltshauser, G. A. A. Gén. Civ.* 3 (1864) 514-.
- of buildings, apparatus. *Lametz, —. Metz Ac. Mm.* 65 (1887) 238-.
- , —, comparison of different systems. *Bacon, A. J. Br. Archt. T.* (1880-81) 105-.

- Warming of buildings, English methods.
Decandolle, A. P. Bb. Un. 40 (1829) 142-.
- — — by motive force and electric current.
Lippmann, G. Lum. Élect. 11 (1894) 421-.
- — — steam. *Hemptinne, A. D. de.*
 [1817] Brux. Mm. Cour. 1 (1818) 52 pp.
- — — — —, U. S. A. *Briggs, R.* [1882]
 I. CE. P. 71 (1883) 95-.
- — — carriages, etc., by crystallised sodium acetate. *Ancelin, A.* C. R. 93 (1881) 309-.
- — — conservatories. *Moll, G.* Hall Bij. 5 (1830) 121-.
- — — *Ainger, A.* (xii) Gard. Chron. (1841) 211-, 259-, 307-, 323-, 428-, 484-, 579-, 683-, 843-.
- — — by steam. *Bailey, W.* (vi Add.) Haarl. Ntk. Vh. Mtsch. 13 (1824) 199-.
- — — by hot air, advantages and disadvantages. *Fodor, J.* [1881] (xii) D. Vjschr. Gandhpfl. 14 (1882) 118-.
- — — apparatus. *Ducrot, —.* C. R. 76 (1873) 1537-.
- — — water. *Moll, G.* Hall Bij. 6 (1831) 354-.
- — — — —, best temperature and dimensions. *Weiss, T.* Förster Al. Bauztg. 33-34 (1868-69) 395-.
- — — pipes. *Colding, L. A.* Kjöb. Ov. (1862) 25-.
- — — — —, *Anderson, W.* I. CE. P. 48 (1877) 257-.
- — — — —, theoretical principles. *Grashof, F.* [1876] (xii) Karlsruhe Nt. Vr. Vh. 8 (1881) 60.
- — — of houses, development in future. *Meyer, M.* Erdm. J. Tech. C. 16 (1833) 307-.
- — — rooms. *Arzberger, J.* Wien Jb. Pol. I. 17 (1832) 1-.
- — — — —, *Osann, G.* Erdm. J. Pr. C. 12 (1837) 48-; 16 (1839) 226-.
- — — — — with stoves. *Blesson, L.* Erdm. J. Tech. C. 18 (1833) 281-.
- — — — —, *Meyer, M.* Erdm. J. Pr. C. 2 (1834) 439-.
- — — school buildings, Munich. *Forster, J., & Voit, E.* Z. Bl. 13 (1877) 1-, 305-.
- — — by steam, best temperature. *Weiss, T.* Förster Al. Bauztg. 33-34 (1868-69) 410-.
- — — use of gas. *Elsner, R. W.* Dingler 126 (1852) 284-.
- — — and ventilation, Vincennes Military Hospital. *Grouvelle, P.* A. Gén. Civ. 1 (1862) 9-.
- Water, heating from surface. *Laborde, —.* C. R. 73 (1871) 561-.
- — — by waste steam (Woolf). *Nicholson, W.* Nicholson J. 2 (1802) 203-.
- Workshops, prevention of excessive heating. *Deny, E.* [1884] Mulhouse S. In. Bil. 55 (1885) 5-.

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- Olzewski, K.* C. R. 101 (1885) 238-.
- Air cooling in warm climates. *Smyth, C. P.* [1849] Edinb. R. S. P. 2 (1851) 235-.
- refrigerating machinery and its applications. *Coleman, J. J.* I. CE. P. 68 (1882) 146-.
- Alcarazzas or Spanish water-cooling vessels. *Lasteyrie, —.* J. Mines 6 (1796-97) 791-.
- — — — —, *Guyton de Morgeau, L. B.* A. C. 25 (1798) 167-.
- — — — —, *Fabroni, G.* J. de Ps. 49 (1799) 228-.
- Apparatus. *Linde, C.* A. Ps. C. 57 (1896) 328-; Gén. Civ. 31 (1897) 35-, 51-; Z. Elektch. (1897-98) 2-.
- , recording. *Gibier, P.* C. R. 96 (1883) 1624-.
- Artificial cold, production. *Pepys, W. H.* Tilloch Ph. Mg. 3 (1799) 76-.
- — — — —, *Göppert, H. R.* Froriep Not. 25 (1829) 85-.
- — — — —, and applications. *Witz, A.* [1891] Rv. Quest. Sc. 31 (1892) 78-.
- — — — — use. *Richard, G.* A. Cons. Arts et Mét. 1 (1889) 133-.
- — — — —, use in exploitation of water-bearing strata. *Schmidt, F.* St. Ét. Bil. S. In. Mn. 9 (1895) 273-.
- Boiling oxygen as cooling agent. *Wroblewski, S. von.* Wien Az. 21 (1884) 6-; Mh. C. (1884) 47-.
- — — — —, *Olzewski, K.* Wien Az. 22 (1885) 129-; Mh. C. (1885) 493-.
- Carbon dioxide, solid, physical properties. *Nystrom, J. W.* Franklin I. J. 70 (1875) 355-.
- — — — —, properties. *Villard, P., & Jarry, R.* C. R. 120 (1895) 1413-; Par. S. Ps. Sé. (1895) 177-.
- Cold air and freezing apparatus. *Perkins, L.* S. C. In. J. 8 (1889) 378-.
- producing machine. *Kirk, A. C.* [1864] Glasg. T. I. Eng. 8 (1865) 14-.
- — — — —, *Lebrun, B.* Rv. Un. Mines 18 (1892) 324-.
- , production, commercial. *Armengaud, J. A.* Rv. Sc. 18 (1880) 1023-.
- — — — —, mechanical. *Kirk, A. C.* I. CE. P. 37 (1874) 244-.
- — — — —, by expansion of air. *Armengaud, J. A.* I. CE. P. 39 (1875) 435-.
- — — by methyl chloride. *Vincent, C.* Par. S. Ps. Sé. (1878) 20-; J. Phm. 30 (1879) 132-.
- — — — —, muriate of lime (calcium chloride). *Walker, Rich.* Phil. Trans. (1801) 120-.
- Compressed air, application. *Schneebeli, H.* [1875] Neuch. S. Sc. Bil. 10 (1876) 240-.
- Continuous process. *Cailletet, L.* C. R. 97 (1883) 1115-.
- Cooling machine for laboratory. *Turettini, H., & Picet, R.* Par. Poids et Mes. PV. (*1875-76) 123-.

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- Cryogenic laboratory, Leiden, work at. *Kamerlingh Onnes*, *H.* *Amst. Ak. Vs.* 3 (1895) 164—.
- and thermometric application of carbon dioxide snow. *Du Bois*, *H.*, & *Wills*, *A. P.* *D. Ps. Gs. Vh.* (1899) 168—.
- Freezing by expansion of air. *Gilbert*, *L. W.* *Gilbert A.* 18 (1804) 412—.
- machines, new. *Pictet*, *R.* *Arch. Sc. Ps. Nt.* 13 (1885) 212—.
- , — arrangements. *Pictet*, *R.* *Arch. Sc. Ps. Nt.* 13 (1885) 397—.

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- Rudorff*, *F. A.* *Ps. C.* 122 (1864) 337—.
- Berthelot*, *M.* *C. R.* 78 (1874) 1173—.
- formed by acid and hydrated salt. *Ditte*, *A.* *C. R.* 90 (1880) 1163—.
- — — — — *Berthelot*, *M.* *C. R.* 90 (1880) 1191—.
- carbon dioxide and sulphur dioxide. *Pictet*, *R.* *Arch. Sc. Ps. Nt.* 14 (1885) 570—.
- 2 crystallised salts. *Ditte*, *A.* *C. R.* 90 (1880) 1282—.
- ice and salt. *Meidinger*, *H.* *Halle Z. Nw.* 40 (1872) 106—.
- snow and alcohol. *Marchand*, *R. F.* *Erdm. J. Pr. C.* 25 (1842) 253—.
- — — sulphuric acid. *Pfaundler*, *L.* *Wien Sb.* 71 (1875) (*Ab.* 2) 509—.
- with solid carbon dioxide. *Cailletet*, *L.*, & *Colardeau*, *E.* *C. R.* 106 (1888) 1631—.
- historical account. *Lippmann*, *E.* *C. R.* 90 (*Z. Angew. C.* (1898) 739—.
- strong artificial. *Marchand*, *R. F.* *Erdm. J. Pr. C.* 32 (1844) 499.
- theory. *Potier*, *A.* *C. R.* 101 (1885) 998.

- Freezing by rapid evaporation. *Leslie*, *J.* *A. C.* 78 (1811) 177—.
- — — — — (*Leslie*). *Clément*, —, & *Désormes*, —. *A. C.* 78 (1811) 183—.
- water-logged deposits, Gobert process. *Gobert*, *A.* *Brux. S. Blg. Gl. Bll.* (1897) (*PV.*) 65—.
- Hoar frost produced by capillarity and evaporation. *Decharme*, *C.* *C. R.* 86 (1878) 1004—.
- Ice and cold, artificial production. *Paul*, *B. H.* *Q. J. Sc.* 6 (1869) 197—.
- machines. *Schmidt*, *G.*, & *Zeuner*, *G.* *Dingler* 244 (1882) 89—.
- — — *Corsepius*, —. *Civing.* 38 (1892) 435—.
- , volatile liquids for. *Seely*, *C. A.* [1870] *N. Y. Lyceum P.* 1 (1870—71) 59—.
- Insulation of cold stores. *Brown*, *F. D.* [1897] *N. Z. I. T.* 30 (1898) 44—.
- Liquefied gases and low temperatures. *Dessau*, *B.* [1900] *Ps. Z.* 2 (1901) 20—, 37—, 60—.
- , use as cooling materials. *Cailletet*, *L.* *C. R.* 94 (1882) 1224—; *A. C.* 29 (1883) 153—.

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- Liquefied gases, use as cooling materials. *Wroblewski*, *S. von.* *Wien Ak. Sb.* 91 (1885) (*Ab.* 2) 667—; *Mh. C.* (1885) 204—.
- marsh gas, use. *Cailletet*, *L.* *C. R.* 98 (1884) 1565—.
- — — — — *Wroblewski*, *S.* *C. R.* 99 (1884) 136—.
- — — — — *Cailletet*, *L.* *Ph. Mg.* 19 (1885) 65.
- Liquid air. *Dewar*, *J.* [1896] *R. I. P.* 15 (1899) 133—.
- as analytical agent. *Dewar*, *J.* [1898] *R. I. P.* 15 (1899) 815—.
- and its applications. *Belforti*, *U.* *Rv. Sc.-Ind.* 31 (1899) 65—.
- , scientific uses. *Dewar*, *J.* [1894] *R. I. P.* 14 (1896) 393—.
- , vacuum vessels. *Dewar*, *J.* [1893] *R. I. P.* 14 (1896) 1—.
- hydrogen, etc., temperatures obtainable by free evaporation. *Wroblewski*, *S.* *C. R.* 100 (1885) 979—.
- Mercury, congelation by ether. *Marcet*, *A.* *Nicholson J.* 34 (1813) 119—.
- Poetsch process (sinking shafts by previously freezing the ground). *Saclier*, —. *St. Ét. Bll. S. In. Mn.* 11 (1897) 647—.
- at the Vicoq pit. *Saclier*, —, & *Waymel*, —. *St. Ét. Bll. S. In. Mn.* 9 (1895) 27—.
- Rapid production. *Carmichael*, *H.* [1882] *Am. As. P.* 31 (1883) 223—.
- Refrigerating apparatus. *Linde*, *C. S. C. In.* *J.* 13 (1894) 502—.
- machines. *Planet*, *E. de.* *Toul. Ac. Sc. Mm.* 1 (1879) (*Sem.* 2) 246—.
- — — *Lightfoot*, *T. B.* *I. ME. P.* (1886) 201—.
- Refrigeration. *Bickerton*, *A. W.* [1881] *N. Z. I. T.* 14 (1882) 394—.
- of air, processes and applications. *Jougllet*, *A.* *Mon. Sc.* 15 (1873) 275—.
- , artificial. *Gamgee*, *J.* *U. S. Fish Com. Rp.* 5 (1879) 901—.
- and ice-making machines. *Selse*, *N. N. S.* *W. R. S. J.* 30 (1897) xxxii—.
- by liquids at low temperatures. *Schloesing*, *T.* *C. R.* 111 (1890) 85—.
- , mechanical, bibliography. *Bourne*, *J.* *I. CE. P.* 37 (1874) 271—.
- for preservation of foods. *Tolson*, *J.* [1886] *Queensl. R. S. P.* 3 (1887) 49—.
- Refrigerator. *Osann*, *G.* *Würzb. Vh.* 5 (1855) 410—.
- *Carré*, *E.* *C. R.* 64 (1867) 897—.
- for brewers' wort. *Davison*, *R.* (*vi Adds.*) *CE. I. P.* 1 (1841) 57—.
- with volatile liquids not miscible at low temperatures. *Pictet*, *R.* *C. R.* 100 (1885) 329—.
- Temperature of water in freezing mixture. *Gough*, *J.* *Nicholson J.* 13 (1806) 189—.
- Temperatures under -100°, production and effects. *Pictet*, *R.* *Cztg. Opt.* 12 (1891) 275—.
- Water, artificial freezing. *Decourdemanche*, —. *J. Phm.* 11 (1825) 584—.
- , freezing by ether. *Hare*, *R.* *Sturgeon A. Electr.* 5 (1840) 151—.
- , —, new method. *Leslie*, *J.* *Thomson A. Ph.* 9 (1817) 412—; *Tilloch Ph. Mg.* 51 (1818) 411—.

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Water, freezing by sulphuric acid. *Hare, R.* Philad. Coll. Phm. J. 6 (1835) 91-
 —, — — — and ether. *Hare, R.* [1838-40] *Sturgeon A. Electr.* 2 (1838) 400-; *Am. Ph. S. T.* 7 (1841) 215-.

1014 Methods of Producing Constant Temperatures. Thermostats.

Foerster, W. Par. Poids et Mes. PV. (*1875-76) 128-; (*1877) 245-.
Crew, H. Ph. Mg. 33 (1892) 89-.
Gouy, —. C. R. 117 (1893) 96-.
 Apparatus. *Merryweather, G.* Edinb. N. Ph. J. 14 (1833) 360-.
 —. *Kohlrausch, F. A.* Ps. C. 125 (1865) 626-.
 —. *Cady, H. P.* J. Ps. C. 2 (1898) 242-.
 — (calorifères à feu continu). *Pelet, L.* Laus. S. Vd. Bil. 34 (1898) 243-.
 — for maintaining constant temperature above 100°. *Ulsch, K.* Z. Vr. Rübenzuckin. 40 (1890) 1039-.
 — — obtaining constant temperature water current. *Pulfrich, C.* Z. Instk. 18 (1898) 49-.

Automatic maintenance of constant temperature in chamber. *Arsonval, A. d'.* C. R. 107 (1888) 194-; Par. S. Bl. Mm. 40 (1888) (C. R.) 530-.

— regulation. *Čebyšev, (Lt.-Gen.) V. L.* Rs. Ps.-C. S. J. 28 (Ps.) (1896) 56-.
 — — and registration. *Parenty, H., & Bricard, R.* C. R. 122 (1896) 919-.

Constant high temperatures in metallic vapour baths. *Barus, C., & Hallock, W. U. S.* Gl. Sv. Bil. No. 54 (1889) 56-.

— temperature from 100° to 700°. *Bodenstein, M.* Z. Ps. C. 30 (1899) 113-.

—, d'Arsonval's method of maintaining. *Neesen, F.* [1882-83] (XII) Berl. Ps. Gs. Vh. 1 (1882) 39-; 2 (1884) 29.

— in buildings. *Wild, H.* [1885] St. Pét. Ac. Sc. Bil. 30 (1886) 363-.

— and pressure, maintenance. *Brown, F. D.* [1879] L. Ps. S. P. 3 (1880) 68-; Ph. Mg. 7 (1879) 411-.

Heat regulation, thermoelectric. *Regaud, C., & Fouilliand, R.* J. Pl. Pth. Gén. 2 (1900) 457-.

Hot blast, equalisation of varying temperatures. *Gjers, L. F., & Harrison, J. H.* I. & S. I. J. (1900) (No. 1) 154-.

Incubator with electromagnetic arrangement for constant temperature. *Landois, C. C. A. L.* N.-Vorp. Mt. 12 (1880) 81-.

Oil bath, convenient form. *Evans, W. P.* [1897] N. Z. I. T. 30 (1898) 495-.

Regulation of temperature. *Prytz, K.* Kjøb. Ov. (1892) 142-; Fsch. Ps. (1892) (Ab. 2) 249.

Regulator (Sir J. Hall's). *Hall, B.* [1833] Gl. S. P. 1 (1834) 478-.

— *Benoit, R.* Par. S. Ps. Sé. (1879) 6-.

— *Arsonval, A. d'.* C. R. 92 (1881) 76-.

— *Dupetit, —.* [1884] Bordeaux S. Sc. Mm. 2 (1886) xxvii-.

Regulator. *Soret, C.* [1884] Arch. Sc. Ps. Nt. 13 (1885) 70-.

— *Darwin, H.* Nt. 33 (1886) 596-.

—, electrical. *Grassini, R.* Rv. Sc.-Ind. 82 (1900) 27-.

—, gas. *Schwald, E.* Z. Ws. Mkr. 5 (1898) 331-.

—, —. *Weiss, G.* Par. S. Bl. Mm. 49 (1897) (C. R.) 88.

—, —, and thermostat for incubators. *Heydenreich, L.* Z. Ws. Mkr. 9 (1892) 299-.

—, metastatic. *Randolph, N. A.* Franklin I. J. 118 (1884) 178-.

—, new. *Novy, F. G.* Mkr. S. J. (1898) 478-.

—, selenium photo-electric. *Germain, P.* C. R. 91 (1880) 688-.

— and thermograph. *Baumhauer, E. H. von.* Arch. Néerl. 19 (1884) 297-.

— for warming by steam. *Fischer, Herm.* Dingler 234 (1879) 161-.

— of wide range. *Gumlich, E.* Z. Instk. 18 (1898) 317-.

Regulators. *Brown, J. T.* Nt. 26 (1882) 114-.

— *Bievliet, — van.* Brux. S. Sc. A. 12 (1888) (Pt. 1) 75-.

— *Riehrbeck, H.* D. Nf. Tbl. (1889) 721-.

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Ure, Andr. R. S. P. 3 (1831) 67.

Guthrie, Fred. Ph. Mg. 36 (1868) 30-.

(Hipp's.) *Hirsch, A.* Carl Rpm. 4 (1868) 200-.

Laspeyres, E. A. H. A. Ps. C. 152 (1874) 132-.

Baur, C. Berl. Ps. Gs. Vh. (1886) 44-.

Pernet, J. Berl. Ps. Gs. Vh. (1886) 55-.

Arsonval, A. d'. C. R. 107 (1888) 194-; Par. S. Bl. Mm. 40 (1888) (C. R.) 530-.

(d'Arsonval's.) *Rohrbeck, H.* D. Nf. Tbl. (1888) 1.

Michel, A. Par. S. Bl. Mm. 44 (1892) (C. R.) 932-.

electric. *Dumoncel, T.* [A. L.] C. R. 38 (1854) 1027-.

— *Kurčinskij, V. P.* [1891-93] Kiev S. Nt. Mm. 12 (2) (1892) xlvii-; Fsch. Ps. (1893) (Ab. 2) 272-.

— *Whitney, W. R.* Am. As. P. (1897) 127.

— *Duane, W., & Lory, C. A.* Am. J. Sc. 9 (1900) 179-.

—, for bacteriological incubator. *Hanfland, F.* Z. Ws. Mkr. 17 (1900) 440-.

with electric heating to 500°. *Rothe, R.* Z. Instk. 19 (1899) 143-.

— regulator. *Gouy, —.* J. de Ps. 6 (1897) 479-.

existing forms. *Hammerl, H.* Carl Rpm. 18 (1882) 309-, 385-, 441-.

gas. *Edwards, A. M. A. C.* 25 (1872) 390-.

without gas. *Karawaiew, W.* Z. Ws. Mkr. 13 (1896) 172-.

—, modification. *Karawaiew, W.* Z. Ws. Mkr. 13 (1896) 289-.

gas pressure regulator for. *Knudsen, L.* [1884] Kjøb. Carlsb. Lb. Mdd. 2 (1888) 134- (Réts. 78-).

1200 Thermometry

- gas pressure regulator for. *Murrill, R. Mer.*
S. J. (1898) 480-.
- improvement. *Blümcke, A. A. Ps. C. 25*
(1885) 419-.
- *Golicyn, (Prince) B. B. St. Pét. Ac. Sc.*
Bll. 7 (1897) xv-.
- for incubation and artificial digestion experi-
ments. *Randolph, N. A. Franklin I. J. 86*
(1883) 465-.
- — microscope work. *Koch, A. Z. Ws.*
Mkr. 10 (1893) 161-.
- self-regulating (without gas or electricity).
Landois, L. N.-Vorp. Mt. 24 (1892) 30-.
- simple. *Reichert, E. A. Ps. C. 144* (1872)
467-.
- and sensitive. *Andrae, G. [J.] L. (xii)*
Mbl. Nt. 8 (1878) 98-; (ix) A. Ps. C. 4
(1878) 614-.
- , working by gas pressure. *Baumhauer,*
E. H. von. C. R. 99 (1884) 370-.
- for temperatures between 50° and 300°.
Mahlke, A. Z. Instk. 13 (1893) 197-.

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1200 General.

- Cotte, L. J. de Ps. 68* (1809) 132-, 222-.
- Egen, P. N. C. Pogg. A. 11* (1827) 276-, 335-,
517-; 13 (1828) 33-.
- Pernet, J. Carl Rpm. 11* (1875) 257-.
- Mills, E. J. Ph. Mg. 6* (1878) 62-.
- Crafts, J. M. C. R. 91* (1880) 574-.
- Mills, E. J. Edinb. R. S. T. 29* (1880) 567-;
Ph. Mg. 12 (1881) 142-.
- Brown, F. D. L. Ps. S. P. 5* (1884) 116-;
Ph. Mg. 14 (1882) 57-.
- Gerland, E. Kassel Vr. Nt. Festschr. (1886)*
62-.
- Walter, B. Z. Instk. 12* (1892) 342-.
- Busmann, —. [1897] Westf. Vr. Jbr. (1897-
98) 143-.*
- Cole, A. S., & Durgan, E. L. Ps. Rv. 4* (1897)
217-.
- Chree, C. Nt. 58* (1898) 304-; Ph. Mg. 45
(1898) 205-, 299-.
- Aneroid-thermoscope, lecture demonstration
apparatus. *Karsten, G. [1889] Schl.-
Holst. Nt. Vr. Schr. 8* (1891) 17-.
- Barometer, formula for use as thermometer.
Villeneuve, — (comte) de. Fr. Cg. Sc. 33
(1866) 339-.
- Capillary corrections to pressure and tempera-
ture measurements. *Pernet, J. Z. Instk.*
6 (1886) 377-.
- Glass, change in properties. *Weber, R. Par.*
Bll. S. C. 1 (1864) 305-.
- , "Jena normal." *Wiebe, H. F. Z. Instk.*
6 (1886) 167-.
- , permeability by gases. *Bartoli, A. Rm.*
R. Ac. Linc. T. 8 (1884) 337-.
- , physical properties. *Schott, O. Z. Instk.*
11 (1891) 330-.
- Heat, fundamental laws, and true measure of
temperature. *Schitko, J. Baumgartner Z.*
4 (1828) 436-; 6 (1829) 138-.

Measurement of Temperature 1200

- Heat, measurement, new method. *Müller-
Erzbach, —. Cztg. Opt. 10* (1889) 14-.
- High temperatures. *Saint-Edme, E. Cosmos*
22 (1863) 754-.
- , experiments. *Pouillet, C. S. M. C. R.*
3 (1836) 782-; *Pogg. A. 39* (1836) 544-,
567-.
- and vaporisation of carbon. *Berthelot,*
— C. R. 115 (1892) 1275-.

MEASUREMENT OF TEMPERATURE.

- Pollet, —. Amiens Mm. Ac. (1843) 39-.*
- Fiévet, E. Cuyper Rv. Un. 19* (1866) 308-.
- Bosscha, J. Les Mondes 21* (1869) 720-, 761-.
- Recknagel, G. A. Ps. C. Ergänzt. 6* (1874)
275-.
- Dragoumis, E. J. Berl. B. 10* (1877) 1648-.
- Callendar, H. L. [1886] Phil. Trans. (A) 178*
(1888) 161-.
- Weber, C. L. Cztg. Opt. 11* (1890) 88-, 111-.
- Accuracy. *Renou, E. C. R. 109* (1889) 895-.
- *Guillaume, C. É. C. R. 109* (1889) 963-.
- Air temperature. *Dufour, C. Arch. Sc. Ps.*
Nt. 4 (1897) 344-.
- Atmosphere in sunshine. *Aymonnet, —. C.*
R. 87 (1878) 23-.
- Cyclically varying temperature. *Burstall, H.*
F. W. L. Ps. S. P. 13 (1895) 579-; Ph. Mg.
40 (1895) 282-.
- Flame of water-gas. *Blass, E. [1892] Nt. 47*
(1892-93) 113.
- — — (Blass). *Kurnakow, N. Ftschr.*
Ps. (1893) (Ab. 2) 309.
- High and solar temperatures. *Sainte-Claire
Deville, H. C. R. 74* (1872) 145-.
- — — *Callendar, H. L. [1899] R. I.*
P. 16 (1902) 97-.
- temperatures. *Biot, J. B. J. Mines 17*
(1804) 203-.
- *Prinsep, J. [1827] Phil. Trans. (1828)*
79-.
- *Pouillet, C. S. M. Froriep Not. 24*
(1829) 39-.
- *Erman, A., & Herter, P. Pogg. A.*
97 (1856) 489-.
- *Sainte-Claire Deville, H., & Troost, L.*
C. R. 56 (1863) 977-.
- *Becquerel, E. C. R. 57* (1863) 855-.
- (Becquerel). *Sainte-Claire Deville, H.*
C. R. 57 (1863) 894-.
- *Becquerel, E. C. R. 57* (1863) 925-.
- *Berthelot, M. Par. Bll. S. C. 8* (1867)
387-; A. C. 13 (1868) 144-.
- *Fischer, F. Dingler 230* (1878) 319-.
- *Sainte-Claire Deville, E. H., & Troost,*
L. C. R. 90 (1880) 727-, 773-.
- *Selivanov, T. Rs. Ps.-C. S. J. 23*
(Ps.) (1891) 152-; J. de Ps. 1 (1892) 134-.
- *Barus, C. Ph. Mg. 34* (1892) 1-.
- *Le Chatelier, H. Rv. Sc. 49* (1892)
162-.
- *Roberts-Austen, W. C. I. CE. P. 110*
(1892) 152-.
- *Berghaus, A. Cztg. Opt. 14* (1893)
121-.

- High temperatures. *Deny, É.* Mulhouse S. In. Bll. 64 (1894) 359-.
- *Béguin, L.* Gén. Civ. 28 (1895-96) 388-.
- *Boudouard, —.* Z. Angew. C. (1900) 794.
- *Grünhut, —.* [1900] Nass. Vr. Jb. 54 (1901) XL-.
- Liquids, correction for, in case of insufficient immersion. *Ferrini, R.* Mil. I. Lomb. Rd. 8 (1875) 141-.
- and solids. *Botelho de Lacerda, C.* Lisb. Mm. Ac. Sc. 5 (1818) (pte. 2) 28-.
- Low temperatures. *Pouillet, C. S. M. C. R.* 4 (1837) 513-.
- *Cailletet, L., & Colardeau, E.* C. R. 106 (1888) 1489-; Par. S. Ps. Sé. (1888) 295-.
- *Guillaume, C. É.* Arch. Sc. Ps. Nt. 20 (1888) 396-.
- *Holborn, L., & Wien, W.* A. Ps. C. 59 (1896) 213-; Berl. Ak. Sb. (1896) 673-.
- *Kamerlingh Onnes, H.* Amst. Ak. Vs. 5 (1897) 37-, 79-; J. de Ps. 9 (1900) 128.
- *Kamerlingh Onnes, H., & Boudin, M.* [1900] Amst. Ak. Vs. 9 (1901) 224-, 308; Amst. Ak. P. 3 (1901) 299-, 374.
- Solid homogeneous body. *Betti, E.* Mod. Mm. S. It. 1 (pte. 2) (1868) 165-.
- Sources of error. *Schütt, —.* Z. Angew. C. (1897) 96-.
- Temperature determination in a given time, of variable source of heat. *Indra, A.* Wien Ak. Sb. 105 (1896) (Ab. 2a) 823-.
- and time, measurement, analogy between. *Macgregor, J. G.* [1887] N. Scotia I. Sc. P. & T. 7 (1890) 20-.

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- Bellani, A.* Poligrafo 9 (1832) 169-.
- Dobrzyński, F.* Kosmos (Lw.) 9 (1884) 712.
- Müller-Uri, R.* Braunsch. Vr. Nt. Jbr. (10) (1897) 35-.
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- centigrade, fixing boiling point. *Abbadie, A. T. d'. C. R.* 40 (1855) 847-.
- , —, —, *Melander, G.* Helsingf. Öfv. 33 (1891) 230-.
- , general use. *Uhde, A. D. Nf. Vsm. B.* (1841) 151-.
- construction. *Peñalver, J. L. de.* Madrid A. H. Nt. 2 (1800) 143-.
- *Landriani, M.* Brugnattelli G. 2 (1819) 292-.
- *Rudberg, F.* Stockh. Ak. Hndl. (1834) 354-; Pogg. A. 37 (1836) 376-; 40 (1837) 39-, 562-.
- and definition of temperature. *Potter, R. Ph. Mg.* 24 (1862) 447-.
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- improvements. *Babbini, G.* Firenze A. Ms. Imp. 2 (1810) (pte. 2) 1-.
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- , or cryometer. *Pleischl, A.* Pogg. A. 63 (1844) 115-.
- , very sensitive. *Michelson, A. A.* Par. S. Ps. Sé. (1882) 66-.
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- sensibility. *Thomsen, J.* Kjöb. Ov. (1868) 25-.
- *Guillaume, C. É.* Par. S. Ps. Sé. (1891) 6-.
- *Auzénat, R.* Mon. Sc. 14 (1900) 753-.
- in liquids. *Hartmann, J.* Z. Instk. 17 (1897) 131-.
- and temperature. *Witkowski, A. W.* (xii) Kosmos (Lw.) 8 (1883) 269-, 493-.
- theory. *Handl, A.* Carl Rpm. 17 (1881) 300-.
- tubes, graphical calibration. *Majorana, Q.* Rm. R. Ac. Linc. Rd. 4 (1895) (Sem. 2) 97-.
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- Pyrometer (new). *Daniell, J. F.* QJ. Sc. 11 (1821) 309-.
- (—). *Neumann, A.* Baumgartner Z. 10 (1832) 284-.
- (—). *Lamy, A. C. R.* 69 (1869) 347-.
- Pyrometric experiments. *Hassler, F. R.* [1817] Am. Ph. S. T. 1 (1818) 210-.
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- Temperature and absolute zero. *Bauer, K. L.* A. Ps. C. 153 (1874) 133-.
- , certain effects. *Coathupe, C. T.* Ph. Mg. 17 (1840) 130-.
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- , equilibrium. *Laurent, P. A.* Par. Éc. Pol. J. 40^e cah. (1863) 75-.
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- scale on gas thermometer, and molecular weights. *Berthelot, —.* Rv. Sc. 33 (1894) 513-.
- Thermometric admeasurement and capacity. *Ure, Andr.* Phil. Trans. (1818) 338-.
- Thermometry of the Accademia del Cimento (Florence). *Moritz, A.* [1849] St. Pét. Ac. Sc. Bll. 8 (1850) 19-.

- Thermometry and allied subjects. *Geissler*, —, & *Plicker*, —. Pogg. A. 86 (1852) 238-.
- — plethysmometry, relations between. *Christiani*, A., & *Kronecker*, H. Arch. An. Pl. (Pl. Ab.) (1878) 336-.
- , theorem. *Hartmann*, J. Z. Instk. 17 (1897) 14-; Met. Z. 14 (1897) 45-.
- Transformation of thermal coefficients. *Guillaume*, C. É. Par. Poids et Mes. Tr. Mm. 6 (1888) 25 pp.; Arch. Sc. Ps. Nt. 22 (1889) 5-.
- Transmission apparatus for thermometric readings. *Moennich*, P. Exner Rpm. 24 (1888) 696-.

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- Barometric temperature measurement. *Toepler*, A. Dresden Isis Sb. (1894) 33-; A. Ps. C. 56 (1895) 609-; 57 (1896) 324-.
- Coefficients of expansion of gases and their suitability for use in thermometry. *Crafts*, J. M. C. R. 98 (1884) 1259-.
- Differential thermoscope, use. *Meyer*, O. E. Bresl. Schl. Gs. Jbr. (1897) (Ab. 2a) 25.
- Expansion of glass, influence on readings. *Fischer*, E. G. Berl. Ab. (1816-17) (Ps.) 80-.
- Expansions of air and mercury as given by *Regnault*. *Matthiessen*, L. Z. Mth. Ps. 18 (1873) 323-.
- Exposed column correction. *Rimbach*, E. Berl. B. 22 (1889) 3072-; Z. Instk. 10 (1890) 153-, 292-.
- — — *Guillaume*, C. É. C. R. 112 (1891) 87-; Par. S. Ps. Sé. (1891) 17-; Par. S. C. Bll. 5 (1891) 547-.
- — — *Renou*, —. C. R. 112 (1891) 260.
- — —, auxiliary tube for. *Mahlke*, A. Z. Instk. 13 (1893) 58-.
- — — — — *Guillaume*, C. É. Z. Instk. 13 (1893) 155-.
- Fixed points, determination. *Pernet*, J., *Jaeger*, W., & *Gumlich*, E. Berl. Ps. Reichsanst. Ab. 1 (1894) 81-.
- — —, variation. *Crafts*, J. M. C. R. 91 (1880) 370-.
- Freezing of water on thermometers. *Henrici*, F. C. Pogg. A. 47 (1839) 214-.
- — — (Henrici). *Gintl*, W. Baumgartner Z. 6 (1840) 153-.
- Furnace, temperature, determination. *Mushet*, D. Tilloch Ph. Mg. 4 (1799) 255-.
- Gas-thermometry. *Chappuis*, P. L. Ps. S. P. 17 (1901) 355-; Ph. Mg. 50 (1900) 433-.
- Ibáñez method. *Maurer*, J. Zür. Vjschr. 29 (1884) 139-; Z. Instk. 4 (1884) 269-.
- Irregular indications in thermometers. *Hera-path*, J. Tilloch Ph. Mg. 63 (1824) 8-.
- Kew apparatus for verification of thermometers. *Galton*, F. [1877] R. S. P. 26 (1878) 84-.
- Mercurial thermometry, absolute. *Sworn*, S. A. [1899] R. S. P. 66 (1900) 86-.
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- — — *Pernet*, J., *Jaeger*, W., & *Gumlich*, E. Berl. Ps. Reichsanst. Ab. 1 (1894) 67-.
- — —, and elasticity of glass. *Reggiani*, N. Rm. R. Ac. Linc. Rd. 1 (1892) (Sem. 1) 298-.
- — — correction. *Venable*, F. P., & *Gore*, J. W. Science 7 (1886) 144-, 190.
- — — *Sig*. Science 7 (1886) 168.
- — —, influence. *Delarive*, A., & *Marcet*, F. Bb. Un. 22 (1823) 265-.
- — — *Zantedeschi*, F. Ven. Aten. Esercit. 6 (1848) 273-.
- — — *Vicentini*, G. (xii) Rv. Sc.-Ind. 15 (1883) 178-.
- — — *Pickering*, S. U. L. Ps. S. P. 8 (1887) 234-; Ph. Mg. 23 (1887) 406-.
- — — on vacuous thermometers. *Gintl*, W. Baumgartner Z. 5 (1837) 8-.
- — —, internal. *Guillaume*, C. É. C. R. 103 (1886) 1183-.
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- — —, — — — manometer. *Codazza*, G. Tor. At. Ac. Sc. 8 (1872-73) 351-.
- — —, new. *Wiborgh*, J. Jern.-Kont. A. 43 (1888) 97-; I. & S. I. J. (1888) (No. 2) 110-.
- — — *Jüptner*, H. von. Oestr. Z. Brgw. 42 (1894) 409-.
- — —, *Wiborgh*'s. *Sprung*, A. Oestr. Z. Brgw. 37 (1889) 20-.
- — — *Jüptner*, H. von. Oestr. Z. Brgw. 38 (1890) 397-.
- — — *Crum*, J. [1891] Glasg. I. Eng. T. 35 (1892) 123-.
- — — *Trotz*, E. [1892] Am. I. Mn. E. T. 21 (1893) 592-.
- — —, improvement. *Wiborgh*, J. Jern.-Kont. A. 46 (1891) 81-; I. & S. I. J. (1891) (No. 2) 130-.
- — —, new. *Schw*. Humb. 3 (1884) 382-.
- — —, platinum. *Guyton de Morveau*, L. B. A. C. 46 (1803) 276-.
- — — and thermometer. *Fischer*, F. Dingler 225 (1877) 272-, 463-.
- Pyrometry. *Guyton de Morveau*, L. B. Par. Mm. de l'I. (1808) (Sem. 2) 1-; (1811) 89-.
- — —, recent advances. *Roberts-Austen*, W. C. [1893-94] Am. I. Mn. E. T. 23 (1894) 407-; 24 (1895) 798-.
- Quartz, fused, use in thermometers, etc. *Gautier*, A. C. R. 130 (1900) 816.
- Range 100° to 300°. *Sherman*, O. T. Am. J. Sc. 30 (1885) 42-.
- Silica, fused, resistance to fracture under sudden change of temperature. *Dufour*, —. C. R. 130 (1900) 1753-.
- — —, use in thermometry. *Shenstone*, W. A. Nt. 61 (1899-1900) 540.

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- , and air barometer. Steinhäuser, A. Exner Rpn. 23 (1887) 411-.
- , with barometer. Müller, F. C. G. A. Ps. C. 36 (1889) 763-.
- , calibration of bulb. Cady, W. G. Am. J. Sc. 2 (1896) 341-.
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- , discussion of properties. Potter, R. Ph. Mg. 24 (1862) 263-.
- , for high temperatures. Schneebeli, H. Arch. Sc. Ps. Nt. 8 (1882) 244-; 9 (1883) 355-.
- , —, —, Wiborgh, J. G. Cztg. Opt. 11 (1890) 14-.
- , at high temperatures. Holborn, L., & Day, A. L. Am. J. Sc. 8 (1899) 165-; 10 (1900) 171-.
- , improvements. Soret, C., & Le Royer, A. Arch. Sc. Ps. Nt. 22 (1889) 270-.
- , indications of which are independent of barometric pressure. Michelson, A. A. Am. J. Sc. 24 (1882) 92.
- , with metal bulbs, anomalies. Fuess, R. Z. Instk. 5 (1885) 274-.
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- , new form. Cantzlaar, J. [1816] Zeew. Gn. N. Vh. 2 (1818) 17 pp.
- , —, Grimshaw, W. Ir. Ac. P. 1 (1841) 405-.
- , —, Holten, C. Sk. Nf. F. 3 (1842) 315-.
- , —, Tate, T. Ph. Mg. 20 (1860) 298-.
- , —, Cooke, J. P. Am. J. Sc. 15 (1878) 391-.
- , —, Crafts, J. M. A. C. 14 (1878) 409-.
- , —, Witz, A. C. R. 91 (1880) 164-.
- , self-correcting. Müller, F. C. G. Cztg. Opt. 17 (1896) 14-.
- , with platinum bulb, and invariable zero. Marchis, —. Par. S. Ps. Sé. (1895) 56-.
- , reduction of dead space. Guglielmo, G. Rm. R. Ac. Linc. Rd. 6 (1897) (Sem. 2) 292-.
- , for temperatures above 300° C. Joannis, —. Bordeaux S. Sc. Mm. 4 (1888) xxxv-.
- , theory. Meikle, H. Edinb. N. Ph. J. 1 (1826) 332-.
- , use. Knochenhauer, K. W. [1860-61] Wien SB. 43 (Ab. 2) (1861) 27-; 44 (Ab. 2) (1862) 259-; 45 (Ab. 2) (1862) 229-.
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- , hydrogen, and toluene, at low temperatures. Chappuis, —. Par. Poids et Mes. PV. (1891) 45-.
- , and toluene for, comparison. Benoit, —. Par. Poids et Mes. PV. (1890) 10-.
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- , short. Raikow, P. N. C. Ztg. 19 (1895) 1788.
- gas. Coleman, J. J. Glasg. Ph. S. P. 16 (1885) 220-.
- , Chappuis, P. Arch. Sc. Ps. Nt. 20 (1888) 5-, 153-, 248-.
- , Le Royer, A., & Soret, C. Arch. Sc. Ps. Nt. 20 (1888) 584-.
- , comparison at low temperatures. Olszewski, K. Krk. Ak. (Mt.-Prz.) Rz. 14 (1886) 283-; Fsch. Ps. (1886) (Ab. 2) 278.
- , constant pressure. Thomson, (Sir) W. Edinb. R. S. P. 10 (1880) 539-.
- , —, volume. Foster, G. C. B. A. Rp. (1897) 210-.
- , at high temperatures. Holborn, L., & Day, A. L. Am. J. Sc. 8 (1899) 165-; 10 (1900) 171-.
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- , very sensitive. Grassi, G. Nap. Rd. 24 (1885) 16-, 131-.
- , use. Crafts, J. M. C. R. 106 (1888) 1222-.
- historical account. Smolik, A. Živa 8 (1860) 134-.
- , Wohlwill, E. [1864] A. Ps. C. 124 (1865) 163-.
- , Burckhardt, F. A. Ps. C. 133 (1868) 680-.
- hydrogen, limit of range. Wroblewski, S. C. R. 100 (1885) 979-.
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- , *Guillaume, C. É.* *Arch. Sc. Ps. Nt.* 16 (1886) 507-; 17 (1887) 19-.
- , accuracy. *Crafts, J. M.* *C. R.* 95 (1882) 910-.
- , accurate. *Platanía, G.* *Catania Ac. Gioen.* At. 6 (1893) *Mem.* 2, 4 pp.
- , calibration. *Brit. Ass. Comm.* B. A. Rp. (1882) 145-.
- , changes. *Blackadder, H. H.* *Edinb. J. Sc.* 5 (1826) 47-.
- , construction. *Heinrich, P.* *Schweigger J.* 1 (1811) 214-.
- , determination of fixed points. *Neubert, —.* *Dresden Isis Sb.* (1880) 29-.
- , —, —, and measurement of temperature. *Pernet, J.* *Wien Met. Z.* 14 (1879) 130-; *Par. S. Ps. Sé.* (1881) 136-.
- , —, —, volume of mercury. *Clark, J. W.* *L. Ps. S. P.* 7 (1886) 113-; *Ph. Mg.* 20 (1885) 48-.
- , —, —, — (Clark). *Clayden, A. W.* *L. Ps. S. P.* 7 (1886) 367-; *Ph. Mg.* 21 (1886) 248-.
- , —, —, weight of mercury. *Gerosa, G.* *Rv. Sc.-Ind.* 18 (1886) 326-.
- , electric reading at a distance. *Eschenhagen, M.* *Z. Instk.* 14 (1894) 398-.
- , eliminating variations of fixed points. *Pernet, J.* *C. R.* 91 (1880) 471-.
- , —, —, —, with tables. *Pernet, J.* *Par. Poids et Mes. Tr. Mm.* 1 (*1881) B. 1-; B. 1-.
- , after heating. *Wiebe, H. F.* *Z. Instk.* 8 (1888) 373-.
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- , at high temperatures. *Wiebe, H. F.* *Z. Instk.* 10 (1890) 207-.
- , influence of glass on readings. *Pernet, J., Jaeger, W., & Gumlich, E.* *Berl. Ps. Reichsanst. Ab.* 1 (1894) 5-.
- , insensitive. *Govi, G.* *Nap. Rd.* 21 (1882) 162-.
- , life history. *Sworn, S. A.* *B. A. Rp.* (1896) 729.
- , new form. *Pernet, J.* *Berl. Ps. Gs. Vh.* (1887) 37-.
- , oldest. *Hellmann, G.* *Met. Z.* 14 (1897) 31-.
- , reduction formula. *August, E. F.* *Pogg. A.* 13 (1828) 119-.
- , separation of column. *Gromadzki, A.* *Mosc. Obs. A.* 3 (Pt. 2) (*1877) 135-.
- , use. *Dwars, B. W.* (XII) *Mbl. Nt.* 9 (1879) 78-.
- , —, *Crafts, J. M.* [1883] *Am. C. J.* 5 (*1883-84) 307-.
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- , *Jüllig, M.* *Wien Ak. Sb.* 79 (1879) (Ab. 2) 349-.
- , *Drechsler, A.* *Lpldina.* 24 (1888) 93-.
- , *Breguet's.* *Siber, T.* *Schweigger J.* 20 (1817) 465-.

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- , — and *Holzmann's.* *Neumann, A.* *Baumgartner Z.* 10 (1832) 284-.
- , calculation. *Bonnesen, E.* *Fachr. Ps.* (1884) (Ab. 2) 325-.
- , first. *Gerland, E.* *Lpldina.* 24 (1888) 160-.
- , for high temperatures. *Walker, Rich.* *Tilloch Ph. Mg.* 36 (1810) 119-.
- , *Regnier's.* *Brisson, B.* *Par. Mm. de l'I.* 2 (1796) (H.) 18-.
- , solution of 2 problems. *Argand, —.* *Gergonne A. Mth.* 4 (1813-14) 29-.
- , *Winnerl's.* *Winnerl, —.* *As. Nr.* 7 (1829) 217-.
- metastatic. *Grellois, E.* (XII) *Metz Ac. Mm.* 50 (1870) 375-.
- , corrections. *Scheurer-Kestner, —.* *C. R.* 121 (1895) 553-.
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- petroleum ether. *Kohlrausch, F.* *A. Ps. C.* 60 (1897) 463-.
- , —, *Mewes, R.* *Dingler* 315 (1900) 785-.
- potassium-sodium. *Baly, E. C. C., & Chorley, J. C.* *Berl. B.* 27 (1894) 470-.
- pressure. *Mitscherlich, A.* *D. Nf. Tbl.* (*1875) 96.
- quartz, for high temperatures. *Dufour, A.* *C. R.* 130 (1900) 775-.
- sensitive. *Joule, J. P.* *Manch. Ph. S. P.* 3 (1862-63) 73-.
- spiral. *Breguet's.* *Holtz, W. N.-Vorp. Mt.* 17 (1886) 63-.
- , *Florentine.* *Schiff, H.* *C. Ztg.* 19 (1895) 2273.
- steam-pressure. *Thomson, (Sir) W.* *Edinb. R. S. P.* 10 (1880) 432-, 532-.
- sulphuric acid, noteworthy property. *Donle, W.* *Z. Instk.* 13 (1893) 238-.
- and temperature. *Thirion, J.* *Rv. Quest. Sc.* 31 (1892) 353-.
- unimetallic. *Tremeschini, —.* *As. Fr. C. R.* (1878) 493-.
- with vapour tension scale. *Fuchs, P.* *Z. Angew. C.* (1898) 869-.
- weight, comparable with mercury thermometer. *Barbier, É.* *C. R.* 99 (1884) 752-.

- Thermometric studies. *Guillaume, C. É.* *Par. Poids et Mes. Tr. Mm.* 5 (1886) 92+ CLIX pp.
- Thermoscope, new. *Looser, G.* *Bonn NH. Vr. Cor.-Bl.* (1894) 11-.
- , wire and optical arrangement. *Swan, W.* [1883] *Sc. S. Arts T.* 11 (*1887) 54-.
- Zero, change. *Bellani, A.* *Bb. Un.* 21 (1822) 252-; *Brugnattelli G.* 5 (1822) 268-.
- , —, *Gay-Lussac, L. J.* *A. C.* 21 (1822) 330-.
- , —, *Kämtz, L. F.* *Schweigger J.* 40 (=Jb. 10) (1824) 200-.
- , —, *Yelin, J. C. von.* *Kastner Arch. Ntl.* 3 (1824) 109-.
- , —, *Arago, D. F. J.* *A. C.* 33 (1827) 422-.

- Zero, change. *Legrand, J. N.* A. C. C. 63 (1896) 368-; C. R. 4 (1837) 173-.
- , —. *Despretz, C.* C. R. 4 (1837) 926-.
- , —. *Gintl, W.* Baumgartner Z. 5 (1837) 117-.
- , —. *Bellani, A.* [1839] Mod. Mm. S. It. 22 (1841) 76-.
- , —. *Person, C. C.* C. R. 19 (1844) 1314-.
- , —. *Adie, J.* Edinb. N. Ph. J. 49 (1850) 122-.
- , —. *Joule, J. P.* Manch. Lt. Ph. S. P. 6 (1867) 161-.
- , —. *Zink, —.* Würtb. Jh. 28 (1872) 124-.
- , —. *Joule, J. P.* Manch. Lt. Ph. S. P. 12 (1873) 73.
- , —. *Pernet, J.* Wien Met. Z. 14 (1879) 206-, 263.
- , —. *Crafts, —.* Nass. Vr. Jb. 38 (1885) 159.
- , —. *Heycock, C. T.* Camb. Ph. S. P. 7 (1892) 319.
- , —. *Bartoli, A.* Mil. I. Lomb. Rd. 29 (1896) 247-.
- , —. *Marchis, L.* C. R. 123 (1896) 799-; 124 (1897) 493-; 125 (1897) 294-, 434-, 472; Z. Ps. C. 29 (1899) 1-.
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- , —. determination. *Giordano, G.* Nap. Rd. 11 (1872) 235-.
- , —. *Tellier, C.* C. R. 75 (1872) 578-.
- , —. *Craig, B. F.* Am. C. 3 (1873) 325.
- , —. *Krebs, G.* Carl Rpm. 10 (1874) 207-.
- , —. *Harker, J. A.* R. S. P. 60 (1897) 154-.
- , fall. *Crafts, J. M.* C. R. 94 (1882) 1298-.
- , —. course. *Böttcher, A. Z.* Instk. 8 (1888) 409-.
- , —. effect of composition of glass. *Weber, R.* Berl. Ak. Sb. (1883) 1233-.
- , —. freedom from. *Weber, R.* D. Nf. Tbl. (1889) 249-.
- , rise. *Flaugergues, H.* Bb. Un. 20 (1822) 117-.
- , —. *Crafts, J. M.* C. R. 91 (1880) 291-.
- , —. *Young, S.* Nt. 41 (1890) 152.
- , —. *Tomlinson, H.* Nt. 41 (1890) 198.
- , —. *Mills, E. J.* Nt. 41 (1890) 227.
- , —. *Young, S.* Nt. 41 (1890) 271-, 488-.
- , —. *Mills, E. J.* Nt. 41 (1890) 537-.

1230 Electrical Thermometry.

- Bolometer. *Langley, S. P.* Am. Ac. P. 16 (1881) 342-.
- , —. *Crova, A.* A. C. 29 (1893) 137-.
- , —. measurements with by zero method. *Crova, A.* As. Fr. C. R. (1892) (Pt. 1) 178-.
- , —, —. *Wadsworth, F. L. O.* Asps. J. 5 (1897) 268-.
- , —. sensitiveness. *Guye, C. E.* Arch. Sc. Ps. Nt. 24 (1890) 669-.
- , —. surface-construction. *Lummer, O., & Kurlbaum, F.* Z. Instk. 12 (1892) 81-.
- , —. theory. *Reid, H. F.* Am. J. Sc. 35 (1888) 160-.
- , —. *Guye, C. E.* Arch. Sc. Ps. Nt. 27 (1892) 26-.

MEASUREMENT OF TEMPERATURE.

- by aid of telephone. *Lenz, R.* St. Pét. Ac. Sc. Bil. 29 (1884) 291-.
- resistance method. *Siemens, C. W.* R. I. P. 6 (1872) 438-.
- , —. *Bartoli, A., & Somigliana, C.* Mil. I. Lomb. Rd. 29 (1896) 275-.
- , —. (high temperatures). *Griffiths, E. H.* Nt. 53 (1895-96) 389-.
- , —. *Clark, G. M.* Elect. 38 (1897) 175-, 241-, 273-, 371-, 747-.
- , —. *Chrustschow, P., & Sitnikow, A.* Fsehr. Ps. (1898) (Ab. 2) 257.
- , —. and thermoelectric method. *Guillaume, C. É.* Lum. Elect. 28 (1888) 201-, 312-, 409-, 454-, 566-, 601-.
- , —, —. (high temperatures). *Holborn, L., & Wien, W.* Z. Instk. 12 (1892) 257-, 296-.
- , —, —. *Blondin, J.* Lum. Elect. 47 (1893) 21-, 75-, 125-.

Thermoelectric Measurement.

- Regnault, V.* Bb. Un. Arch. 10 (1849) 265-; 11 (1849) 5-, 265-.
- Boutan, A.* C. R. 47 (1858) 74-.
- (Boutan). *Bequerel, A. C.* C. R. 47 (1858) 173-, 717-.
- Rossetti, F.* N. Cim. 26 (*1867) 404-.
- Arsonval, A. d'.* Lum. Elect. 5 (*1881) 40-.
- Rosenthal, J.* [1894] Erlang. Ps. Md. S. Sb. 26 (1895) 40-.
- Aubel, E. van, & Paillot, R.* Arch. Sc. Ps. Nt. 33 (1895) 148-.
- Fessenden, R. A.* Nt. 53 (1895-96) 244-.
- Jacobus, D. S.* Am. As. P. (1900) 151.
- of flames. *Waggner, W. J.* Berl. Ps. Gs. Vh. (1895) 78-; A. Ps. C. 58 (1896) 579-.
- , —. *Berkenbusch, F. A.* Ps. C. 67 (1899) 649-.
- , —. high temperatures. *Bequerel, A. C.* A. C. 31 (1896) 371-.
- , —. *Siemens, E. W. von, & Halske, J. G.* (xn) Elekttech. Z. 2 (1881) 246-.
- , —. *Le Chatelier, H.* Par. S. Ps. Sé. (1886) 100-; Gén. Civ. 10 (1886-87) 291-.
- , —. *Barus, C.* U. S. Gl. Sv. Bil. No. 54 (1889) 313 pp.
- , —. *McCrae, J.* A. Ps. C. 55 (1895) 95-.
- , —, —. calibration. *Lindeck, S., & Rothe, R.* Z. Instk. 20 (1900) 285-.
- , —, —. *Nichols, E. L.* Arch. Néerl. 5 (1900) 339-.
- , —, —. present status of research. *Barus, C.* Am. J. Sc. 48 (1894) 332-.
- interpolation formulæ. *Holman, S. W.* Am. Ac. P. 31 (1896) 193-.
- by iron-constantan couple. *Aubel, E. van.* Arch. Sc. Ps. Nt. 6 (1898) 169-.
- of underground and atmospheric temperature. *Bequerel, A. C.* C. R. 46 (1858) 1183-.
- , —. temperature. *Bequerel, A. C., & Breschet, —.* Bb. Un. 7 (1837) 173-.
- , —. *Bequerel, E.* C. R. 56 (1863) 1057-.
- , —. *Pernet, J.* (x) Wild Rpm. Met. 2 (1872) 85-.

- Platinum temperatures. *Dickson, J. D. H.*
Ph. Mg. 44 (1897) 445-.
— thermometry. *Callendar, H. L.* Ph. Mg.
47 (1899) 191-.
— *Chree, C.* [1899] R. S. P. 67 (1901)
3-.

PYROMETERS.

- Heräus, W. C.* Z. Angew. C. (1895) 431-.
electric. *Siemens, C. W. I.* and S. I. J. 1
(1871) 50-.
— *Abney, (Lt.)* —. Ph. Mg. 44 (1872) 80.
— (Siemens's). *Brit. Ass. Comm. (Foster, G. C.)*
B. A. Rp. (1874) 242-.
— *Braun, F.* Elekttech. Z. 9 (1888) 421-.
— (Braun's). *Palaz, A.* Lum. Élect. 30
(1888) 65-.
— *Roberts-Austen, W. C.* [1893] Elect. 32
(1894) 41-.
— *Montpellier, J. A.* Sc. Abs. 3 (1900) 859.
modification of Siemens's. *Spohr, J.* Dingler
257 (1885) 315-.
platinum. *Callendar, H. L. I.* & S. I. J.
(1892) (No. 1) 164-.
technical. *Heräus, W. C., Keiser, —, &*
Schmidt, —. Z. Instk. 15 (1895) 373-.
thermoelectric. *Le Chatelier, H.* Par. S. C.
Bll. 47 (1887) 2.
— *Schoentjes, H.* Arch. Sc. Ps. Nt. 5 (1898)
136-.
— *Le Chatelier's. Rigaut, A.* Lum. Élect. 36
(1890) 308-.
— *Struthers, J.* Sch. Mines Q. N. Y. 12
(1891) 143-; 13 (1892) 221-.
— *Damour, E.* Berg-Hm. Ztg. 51 (1892)
277-; 301-; 310-.
— *Heräus, W. C.* [1895] Z. Elektch.
(1895-96) 276-.
— *Ernst, C. von.* Oestr. Z. Brgw. 45
(1897) 300-.
—, automatic methods of observation.
Roberts-Austen, W. C. I. & S. I. J. (1891)
(No. 1) 90-.
—, calibration. *Holman, S. W.* Am. Ac.
P. 31 (1896) 234-.
—, for melting-point of cast iron.
Moldenke, R. Sc. Abs. 2 (1899) 282.
—, new form. *Jacobus, D. S.* Am. As.
P. (1900) 151.
—, recording. *Roberts-Austen, W. C. I.* & S.
I. J. (1893) (No. 1) 112-.
— *Stansfield, A.* L. Ps. S. P. 16 (1899)
103-; Ph. Mg. 46 (1898) 59-.

Thermograph, thermoelectric, and lunar radiation. *Hutchins, C. C., & Owen, D. E.*
Am. Ac. P. 24 (1889) 125-.

THERMOMETERS.

- Guillaume, C. É.* Par. Poids et Mes. PV.
(1891) 53-.
differential resistance. *Mendenhall, T. C.*
Am. J. Sc. 30 (1885) 114-.
electric. *Solly, E.* Ph. Mg. 19 (1841) 391-.
— contact. *Grunmach, L.* Z. Instk. 9 (1889)
296-.

- electric, for low temperatures. *Witkowski, A.*
Krk. Ak. (Mt.-Prz.) Rz. 3 (1891) 380-; Cro.
Ac. Sc. Bll. (1891) 188-.
—, ——. *Rr.* Dingler 304 (1897) 57-.
—, in medicine. *Guérout, A.* Lum. Élect. 4
(*1881) 153-.
—, modification. *Mascart, É. J.* de Ps. 2
(1873) 313-.
—, registering. *Morin, A. J.* C. R. 64 (1867)
327-.
— resistance-. *Siemens, C. W.* (vi Adds.) Ph.
Mg. 21 (1861) 73-.
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Trans. (A) 182 (1892) 43-.
— *Wade, E. B. H.* Camb. Ph. S. P. 9
(1898) 526-.
— *Chappuis, —.* Par. Poids et Mes. PV.
(1899) 157-.
—, construction. *Callendar, H. L.* Ph. Mg.
32 (1891) 104-.
—, direct reading. *Clark, G. M.* B. A. Rp.
(1894) 758.
—, ——. *Appleyard, R.* [1895] L. Ps. S. P.
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—, for low temperatures. *Griffiths, E. H., &*
Clark, G. M. [1892] Camb. Ph. S. P. 8
(1895) 2-.
—, standardising. *Callendar, H. L., &*
Griffiths, E. H. [1890] Phil. Trans. (A)
182 (1892) 119-.
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46 (1892) 372-.

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(1895) 639-.
— *Whipple, G. C., & Warren, H. E.* [1899]
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—, new. *Rubens, H.* Z. Instk. 18 (1898) 65-,
137.
—, — (Rubens). *Czermak, P.* Z. Instk. 18
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Ac. Linc. Rd. 6 (1890) (Sem. 1) 449-.
—, —, differential. *Nosworthy, W. F.* Tel.
J. 11 (1882) 167-.

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Transpiration, Viscosity,
etc.

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Calorimetric methods. *Arsonval, A. d'.* Lum.
Élect. 13 (1884) 361-, 405-, 445-, 493-.
Evaporation of carbon-tetrachloride. *Müller-*
Erzbach, W. D. Nf. Vh. (1894) (Th. 2,
Hälfte 1) 72-.

Thermograph, Hough's. *Grugan, F. C.* [U.S.]
Chief Sig. Off. A. Rp. (*1877) 510-.

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— — —. *Barillé, —.* C. R. 118 (1894) 246-.
— — —. *Cochius, F. C.* Ztg. 19 (1895) 1733.
— — —, to indicate presence of icebergs.
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— — — (Wilson). *Tyndall, J.* Ph. Mg. 31 (1866) 191-.
— — —. *Vernon, G. V.* Manch. Lt. Ph. S. P. 11 (1872) 129-.
— — —. *Hicks, J. J.* [1874] Met. S. QJ. 2 (1875) 99-.
— — —. *McLeod, H. B. A. Rp.* (1889) 505-.
calorimetric, delicate. *Pickering, S. U. L. Ps.* S. P. 8 (1887) 8-; Ph. Mg. 21 (1886) 330-; L. Ps. S. P. 8 (1887) 229-; Ph. Mg. 23 (1887) 401-.
—, *Pickering's. Wegscheider, R. Z. Instk.* 6 (1886) 266-.
contact. *Fourier, J. B. J. A. C.* 37 (1828) 291-.
deep sea (Six's). *Aboville, —.* J. Mines 9 (1798-99) 75-.
— — —. *Dietrichson, J. L. W. A. Ps. C.* 148 (1873) 298-.
— — —. *Jones, J. R. S. P.* 24 (1876) 321-.
— — —. *Chabaud, V. C. R.* 114 (1892) 65-.
— — —. *Biétrix, E.* Par. S. Phlm. Bll. 6 (1894) 59-.
— — —, tests. *Thoulet, J.* Rv. Mar. et Col. 122 (1894) 204-.
— — —, electrical. *Siemens, (Sir) C. W.* [1882] R. S. P. 34 (1883) 89-.
— — —, —, *Siemens's. Bartlett, J. R.* [1882] Am. As. P. 31 (1883) 221-.
differential (Leslie's). *De Butts, E.* [1814] Am. Ph. S. T. 1 (1818) 301-.
— — —. *Howard, W.* QJ. Sc. 8 (1820) 219-.
— — —. *Ritchie, W.* [1826] Phil. Trans. (1827) 129-.
— — — (Leslie's). *B., D.* Gleanings Sc. 2 (1830) 23-.
— — —. *Kemp, K. T.* Edinb. J. Nt. Gg. Sc. 1 (1830) 262-.
— — —. *Hall, M.* Ph. Mg. 8 (1836) 56-.
— — —. *Walferdin, H. C. R.* 14 (1842) 63-.
— — —. *Dupré, Anat. As. Fr. C. R.* 4 (1875) 420-.
— — —. *Dufour, H.* [1879-83] Laus. S. Vd. Bll. 16 (1880) 655-; J. de Ps. 2 (1883) 321-.
— air. *Brough, J. C. Phm. J.* 10 (1869) 214-.
— — —. *Pfaundler, L.* [1875] Wien Ak. Sb. 72 (1876) (Ab. 2) 729-.
— mercury. *Mendelejeff, D. I.* Berl. B. 8 (1875) 539-.
distance-. *Wheatstone, (Sir) C. B. A. Rp.* 37 (1867) (Sect.) 11-.

- distance-. *Ferrini, R.* Mil. I. Lomb. Rd. 15 (1882) 44-.
— — —. *Luvini, G.* (xii) Rv. Sc.-Ind. 14 (1882) 177-.
— — —. *Becker, A.* Magdeb. Nt. Vr. Jbr. u. Ab. (1889) 32-.
— — —. *Moennich, P.* Z. Instk. 9 (1889) 122-.
— — —. *Puluj, J.* Wien Ak. Sb. 98 (1890) (Ab. 2a) 1502-.
— — —, for hot chamber. *Grosheintz, H.* [1886] Mulhouse S. In. Bll. 57 (1887) 97-.
— — —, of Morin and Barthélemy. *Meylan, E.* Lum. Élect. 32 (1889) 511-.
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hypsometric. *Walferdin, H. C. R.* 17 (1843) 904-.
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— — —. *Walferdin, H.* Par. S. Gl. Bll. 7 (1835-36) 193-; C. R. 40 (1855) 951-.
— — —. *Grüel, C. A.* Dingler 155 (1860) 192-.
— — —. *Geissler, H. A. Ps. C.* 123 (1864) 657-.
— and minimum. *Keith, A.* [1795] Edinb. R. S. T. 4 (1798) 203-.
— — —. *Lemaistre, L. F. J.* Mines 7 (1798) 473-.
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— — —. *Landriani, M.* Brugnattelli G. 1 (1818) 413-.
— — —. *MacVicar, J. G. C. S. J.* 10 (1858) 221-; 11 (1859) 106.
— — —. *Symons, W. C. S. J.* 15 (1862) 299-.
— — —. *Govi, G.* [1864] Tor. Lav. Sc. Fis. Mt. (1869) 5-.
— — —. *Codazza, G.* Tor. At. Ac. Sc. 5 (1869-70) 711-.
— — —. *Denton, S. G.* [1874] Met. S. QJ. 2 (1875) 193-.
— — —. *Duclaux, É. J. de Ps.* 5 (1876) 13-.
— — —. *Kappeller, H.* Wien Met. Z. 18 (1883) 225-; Moncalieri Oss. Bll. 3 (*1883) 87-.
— — —, coloured liquids for filling. *Lüdersdorff, F.* Dingler 118 (1850) 360-.
— — —, gas-. *Gar, A.* (vi Add.) N. Cim. 18 (1863) 238-.
— — —, Hicks's. *Stewart, B. R. S. P.* 10 (1859-60) 312-.
— — —, metallic (Hermann and Pfister's). *Hirsch, A.* [1868] Neuch. Bll. 8 (1870) 221-.
— — —, —, portable. *Jürgensen, L. U. As. Nr.* 14 (1837) 173-.
— — —, registering. *Hall, M.* QJ. Sc. 4 (1818) 43-.
— — —, —, Delta (Δ). *Edinb. J. Sc.* 10 (1829) 159-.

1250 Thermometers Radiation Thermometry, Optical Pyrometry 1255

maximum and minimum, registering. *Lallemand, A. C. R. 66* (1868) 812-.

— — —, —, *Macdougall, W. Sc. Met. S. J. 3* (1873) 78-.

— — —, —, *Trouillet, (le capit.) —. [1885] Doubs S. Mm. 10* (1886) 54-.

— — —, —, application of capillary phenomena. *Barbier, É. (vi Add.) Par. A. Obs. 7* (1863) 368-.

— — —, —, Berton's. *Serpieri, A. Rm. Cor. Sc. 3* (1855) 14-.

— — —, —, Marchi's. *Marangoni, C. N. Cim. 27* (*1868) 318-.

— — —, —, relative merits of types. *Draper, D. U.S. Weath. Bur. Bll. 11* (1894) 710-.

—, new. *Monaco, E. Moncalieri Oss. Bll. 13* (1893) 12.

—, registering. *King, J. Edinb. J. Sc. 9* (1828) 113-.

—, — (King's). *Delta (Δ). Edinb. J. Sc. 9* (1828) 300-.

—, —, *Phillips, J. B. A. Rp. (1832) 574-; (1856) (pt. 2) 41.*

—, —, compensation. *Scott, W. L. C. N. 1* (1860) 98-.

mercurial, electrically read at a distance. *Brown, H. T. Nt. 23* (1881) 464-.

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— mercurial, as maximum thermometer. *Walferdin, H. C. R. 38* (1854) 770-.

minimum. *Walferdin, H. Par. S. Gl. Bll. 7* (1835-36) 354-.

—, alcohol. *Pastorelli, F. Br. Met. S. P. 4* (1869) 264-.

—, Rutherford's, modifications. *Walferdin, H. C. R. 40* (1855) 899-.

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mining. *Birkner, —. Jb. Berg.-Hw. (1898) 108-.*

for physiological purposes. *Marey, É. J. C. R. 92* (1881) 1441-.

platinum, for freezing points of dilute solutions. *Griffiths, E. H. Nt. 62* (1900) 563.

recording. *Harrison, M. B. A. Rp. (1848) (pt. 2) 14-.*

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—, *Lewis, J. Am. As. P. (1860) 21-.*

—, *Hamilton, G. As. S. M. Not. 25* (1865) 29-.

—, *Zech, P. Würtb. Jh. 25* (1869) 101-.

—, *Bouziat, —. (xii) Fr. S. Ag. Mm. (1876) (2) 455-.*

—, *Mallock, A. B. A. Rp. (1882) 477-.*

—, *Artimini, F. Rv. Sc.-Ind. 18* (1886) 201-.

—, *Russell, H. C. N. S. W. R. S. J. 22* (1889) 335-.

—, horary. *Veladini, G. Mil. G. I. Lomb. 3* (1842) 19-; 2 (1850) 55-.

—, metallic. *Maurer, J. (xii) Z. Instk. 3* (1883) 308-.

—, —, maximum and minimum. *Burg, V. [1883] Par. S. Bl. Mm. 35* (*1884) (C.R.) 446-.

registering air- construction. *Sprung, A. U.S. Weath. Bur. Bll. 11* (1894) 718-.

—, for hot springs. *Guzzanti, C. Rass. Sc. Gl. It. 2* (1892) 308-.

Sikes', improvement. *Adie, Rich. Edinb. N. Ph. J. 54* (1853) 84-.

unaffected by radiation. *Joule, J. P. [1867] Manch. Lt. Ph. S. P. 7* (1868) 35-.

with variable mercury filling. *Grützacher, F. Z. Instk. 16* (1896) 171-, 200-.

Thermometric instrument. *Bellani, A. (vi Add.) Majocchi A. Fis. C. 14* (1844) 62-.

— sunshine recorder, U.S. Weather Bureau. *Marvin, C. F. U.S. Weath. Bur. Rp. (1893) 17-.*

Thermoscope. *Rumford, B. (Count) Par. Mm. de l'I. 6* (1806) 71-.

1255 Radiation Thermometry, Optical Pyrometry, etc.

"Absolute black" bodies, electrically heated. *Lummer, O., & Kurlbaum, F. Berl. Ps. Gs. Vh. (1898) 106-.*

Colour, relation to temperature. *Decharme, C. (xii) M.-et-L. S. Ac. Mm. 32* (1875) 102-.

—, — —, *Howe, H. M. Rv. Un. Mines 49* (1900) 200-.

—, — —, (heated steel). *White, M., & Taylor, F. W. [1899] Sc. Abs. 3* (1900) 243.

— thermometer. *Rebenstorff, H. A. Dresden Isis Sb. (1896) 31-.*

Compensation pyrheliometer, radiation measurement by. *Ångström, K. A. Ps. C. 67* (1899) 633-.

OPTICAL PYROMETRY.

Crova, A. [1880] Mntp. Ac. Mm. 10 (1884) 157-.

Nichols, E. L. Am. J. Sc. 19 (1880) 42-.

Crova, A. C. R. 92 (1881) 707-.

Le Chatelier, H. C. R. 114 (1892) 214-; *Par. S. Ps. Sé. (1892) 132-.*

(*Le Chatelier.*) *Becquerel, H. C. R. 114* (1892) 255-.

(*Becquerel.*) *Le Chatelier, H. C. R. 114* (1892) 340-.

(*Le Chatelier.*) *Becquerel, H. C. R. 114* (1892) 390-.

Violle, J. C. R. 114 (1892) 734-.

Crova, A. C. R. 114 (1892) 941-.

Berthelot, D. Par. S. Ps. Sé. (1895) 135-; C. R. 120 (1895) 831-; 126 (1896) 410-.

Pyrometer. *St., H. Oestr. Z. Brgw. 37* (1889) 326.

— (Mesuré et Nouel's). *Ernst, C. Oestr. Z. Brgw. 38* (1890) 533-.

— (— — —). *Struthers, J. Sch. Mines Q. N. Y. 12* (1891) 292-.

—, *Thwaite, B. H. I. & S. I. J. (1892) (No. 1) 183-.*

Pyrometers. *Salomon, —. Z. Angew. C. (1891) 440.*

Red heat and "grey" heat. *Lummer, O. Berl. Ps. Gs. Vh. (1897) 121-.*

Refrangibility of emitted light, measurement by. *Dewar, J. B. A. Rp. 43* (1873) 461-.

Refrangibility of emitted light, measurement by. *Crova, A.* C. R. 87 (1878) 979-; *J. de Ps.* 8 (1879) 196-; C. R. 90 (1880) 252-.

Rotatory polarisation, measurement by (Mesuré and Nouel's method). *Evrard, A.* Gén. Civ. 13 (1888) 43-.

1260 Comparison of Thermometers. Thermometric Scales. Reduction to Thermodynamic Scale. (See also Thermodynamics, 2400, etc.)

Absolute temperature. *Schreber, K.* N.-Vorp. Mt. 29 (1898) 45-.

—, dimensions. *Burton, C. V.* Ph. Mg. 24 (1887) 96-.

—, —. *Abraham, H.* Lum. Elect. 51 (1894) 66-.

— and low temperature. *Gleue, —.* [1899] Lüneb. Nt. Vr. Jh. 15 (1901) xvii-.

— zero of heat. *Dalton, J.* Nicholson J. 5 (1803) 34-.

—, —. *Benzenberg, J. F.* Gilbert A. 61 (1819) 363-.

—, —. *Clément, —, & Désormes, —.* J. de Ps. 89 (1819) 428-.

—, —. *Veinberg [Weinberg], Y. I.* [1868] (xii) Mosc. S. Sc. Bll. 8 (No. 3) (1870) 7-.

—, —. *Koppe, C. A.* Ps. C. 151 (1874) 642-.

—, —. *Klein, J. F.* V. Nost. Eng. Mg. 22 (1880) 279-.

—, — perfect gas-thermometer. *Rankine, W. J. M.* Edinb. R. S. T. 20 (1853) 561-.

Calibration. *Walferdäm, H. C.* R. 17 (1843) 1195.

—, *Krüger, A.* [1872] Helsingf. Öfv. 15 (1873) 52-.

— (Krüger). *Argelander, F. W. A.* [1873] Helsingf. Öfv. 16 (1874) 43-.

—, *Lermantov, V. V.* (xii) Rs. C. Ps. S. J. 10 (Ps.) (1878) [(Pt. 1)] 244-.

—, *Thiesen, M.* Carl Rpm. 15 (1879) 285-, 677-.

—, *Broch, O. J.* Par. Poids et Mes. Tr. Mm. 5 (1886) 82 pp.

—, *Offret, A.* Fr. S. Mn. Bll. 13 (1890) 405-.

—, *Pernet, J., Jaeger, W., & Gumlich, E.* Berl. Ps. Reichsanst. Ab. 1 (1894) 39-.

—, *Hulett, G. A.* Z. Ps. C. 33 (1900) 237-.

— and its errors. *Pernet, J., Jaeger, W., & Gumlich, E.* Berl. Ps. Reichsanst. Ab. 1 (1894) 17-.

—, method, Bessel's. *Rücker, A. W., & Thorpe, T. E.* B. A. Rp. (1881) 540-.

—, —, Hansen's. *Brown, C. G.* V. Nost. Eng. Mg. 29 (1883) 1-.

—, —, Kew. *Griffiths, E. H.* Nt. 52 (1895) 536.

—, — of least squares applied to. *Marek, W. J.* Carl Rpm. 15 (1879) 300-.

Calibration, method of least squares applied to. *Wright, T. W.* Des Moines Anal. 10 (1883) 33-.

—, —, Neumann's. *Russell, T.* Am. J. Sc. 21 (1881) 373-.

—, —, simple. *Holman, S. W.* Am. Ac. P. 17 (1882) 157-.

—, methods, report. *Rücker, A. W.* B. A. Rp. (1882) 145-.

— and standardising. *Pickering, S. U.* Ph. Mg. 21 (1886) 180-.

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Watson, W. L. Ps. S. P. 15 (1897) 122-; Ph. Mg. 44 (1897) 116-.

air, and liquid. *Pierre, J. I.* C. R. 27 (1848) 213-; Caen Ac. Mm. (1852) 1-.

alcohol and air. *White, A. C.* Am. Ac. P. 21 (1886) 45-.

— mercury. *Flaugergues, H.* Zach Cor. 9 (1823) 435-.

Joule's and French standards. *Schuster, A.* Manch. Lt. Ph. S. Mm. & P. 9 (1895) 87-.

mercury. *Dorn, —.* D. Nf. Tbl. (*1874) 174.

—, *Thiesen, M., Scheel, K., & Sell, L.* Berl. Ps. Reichsanst. Ab. 2 (1895) 1-.

— and air. *Regnault, V. A. C.* 5 (1842) 83-; 6 (1842) 370-.

—, — (from 0° to 100° C.). *Waterston, J. J.* [1852] R. S. P. 6 (1850-54) 225-.

—, — (below 100° C.). *Waterston, J. J.* Ph. Mg. 15 (1858) 212-.

—, —. *Bosscha, J.* C. R. 69 (1869) 875-; Arch. Néerl. 4 (1869) 197-; Amst. Vs. Ak. 4 (1870) (Ntk.) 69-; Arch. Néerl. 4 (1869) 461-.

—, —. *Rowland, H. A.* [1879] Am. Ac. P. 15 (1880) 75-.

—, —. *Grunmach, L.* D. Nf. Tbl. (*1881) [45]-.

—, — (greatest differences). *Russell, T.* Smiths. Misc. Col. 33 (1888) Art. 4, 25-.

(Wash. Ph. S. Bll. 9 (1887).)

—, — (between 100° and 300°). *Wiebe, H. F., & Büttcher, A.* Z. Instk. 10 (1890) 16-, 233-.

— (glass 59^{mm}) —, —. *Mahlke, A.* A. Ps. C. 53 (1894) 965-.

— (—, 122^{mm} and resistance) —, —. *Grützmacher, F.* Z. Instk. 15 (1895) 250-.

— (—) —, —. *Lemke, H.* Z. Instk. 19 (1899) 33-.

—, of different glass. *Pierre, J. I.* A. C. 5 (1842) 427-.

—, — (between 0° and 100°). *Wiebe, H. F.* Z. Instk. 10 (1890) 435-.

—, enclosed scale and divided stem. *Gumlich, E., & Scheel, K.* Z. Instk. 17 (1897) 353-.

— and gas. *Chappuis, P.* Par. Poids et Mes. Tr. Mm. 6 (1888) 125 + clxxxvii pp.; Par. Poids et Mes. PV. (1888) 26-.

—, high range (glass 59^{mm}). *Mahlke, A.* Z. Instk. 15 (1895) 171-.

— and hydrogen. *Crafts, J. M.* C. R. 95 (1882) 836-.

—, —. *Scheel, K.* A. Ps. C. 53 (1896) 168-.

mercury and platinum (at low temperatures).
Griffiths, E. H. B. A. Rp. (1890) 130-.
 — — — *Ewan, T., & Gee, W. W. H. Manch.*
Lt. Ph. S. Mm. & P. 4 (1891) 357-.
 — — — *Waidner, C. W., & Mallory, F. J.*
H. Un. Cir. [16 (1896-97)] 42-; *Ph. Mg.* 48
 (1899) 1-.
 platinum and air (at low temperatures).
Dickson, J. D. H. Ph. Mg. 45 (1898) 525-.
 — — — gas. *Harker, J. A., & Chappuis, P.*
 [1899] *Phil. Trans. (A)* 194 (1900) 37-.
 — — — of different purity. *Tory, H. M. L. Ps. S. P.*
 17 (1901) 341-; *Ph. Mg.* 50 (1900) 421-.
 Rossetti's and mercury. *Rossetti, F. As. Fr.*
 C. R. (1879) 404-.
 Rowland's and Paris standard. *Day, W. S.*
Ph. Mg. 46 (1898) 1-.
 below common temperature and for cold
 stations. *Marvin, C. F.* [U. S.] Chief Sig.
Off. A. Rp. (1890) 650-.
 temperatures above 50°. *Pomplun, W. Z.*
Instk. 11 (1891) 1-.
 — — — between 250° and 600°. *Mahlke, A. Z.*
Instk. 14 (1894) 73-.

Dynamical equivalent of temperature in water.
Rankine, W. J. M. [1850-57] *Edinb. R.*
S. T. 20 (1853) 191-; *Edinb. R. S. P.* 3
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Errors of thermometers. *Campbell, W. D. C.*
Cn. J. 1 (1856) 138-.

— — — *Russell, H. C.* [1876] *N. S. W.*
R. S. J. 10 (1877) 35-.

— — — *Waldo, F.* *Science* 21 (1893) 99-.

— — — cause. *Provenzani, F. S. Rm. At.*
N. Linc. 26 (1873) 26-.

— — — of low range. *Pastorelli, F.* *Met. S.*
QJ. 2 (1875) 407-.

Graduation. *Dalton, J. Nicholson J.* 5 (1803)
 34-.

— — — [Shortrede non] *Shortreed, R.* *Gleanings*
Sc. 1 (1831) 87-.

— — — *Person, C. C. R.* 17 (1843) 657-.

— — — *Ackland, W.* [1867] *Br. Met. S. P.* 4
 (1869) 23-.

— — — *Osborne, J. W.* *Am. As. P.* (1876) 75-.

— — — for Arctic expedition. *Welsh, J.* [1852]
R. S. P. 6 (1850-54) 183-.

— — — of clinical thermometer. *Henry, C. As.*
Fr. C. R. (1889) (*Pt.* 1) 254-.

— — — Kelvin's absolute method. *Rose-Innes, J.*
 [1897] *L. Ps. S. P.* 16 (1899) 26-; *Ph. Mg.*
 45 (1898) 227-.

Kew corrections, charts. *Shaw, W. N. B. A.*
Rp. (1888) 590.

Scale of temperature. *Walker, Rich.* *Tilloch*
Ph. Mg. 33 (1809) 166-; 35 (1810) 416-.

— — — *Dulong, P. L., & Petit, A. T. A.*
C. 7 (1817) 113-, 225-, 337-.

— — — *H., —.* *Gleanings Sc.* 1 (1829)
 271-.

— — — *B., D.* *Gleanings Sc.* 2 (1830) 23-.

— — — *Volpicelli, P.* *Rm. At.* 1 (1847-48)
 91-.

— — — *Walferdin, H. C. R.* 41 (1855)
 122-.

Scale of temperature. *Crova, A.* [1872] *Mntp.*
Mm. Ac. Sect. Sc. 8 (1872-75) 81-.

— — — *Brooks, F.* *Am. S. CE. T.* 15
 (1886) 381-.

— — — *Salomon, F.* *Z. Angew. C.* (1891)
 409-.

— — — absolute and gas. *Houllievig, L.*
J. de Ps. 4 (1895) 110-.

— — — arguments against new. *Anon. C.*
Ztg. 15 (1891) 1157-.

— — — centigrade. *Mendelejeff, D. I. Berl.*
B. 7 (1874) 126-.

— — — thermometric (Accademia del Cimento).
Libri, G. A. C. 45 (1830) 354-.

— — — centigrade. *Poggendorff, J. C. A. Ps.*
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— — —, in Denmark and Norway. *Ørsted,*
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— — — and Fahrenheit. *Abbadie, A. T. d'.*
C. R. 30 (1850) 570-.

— — —, reduction. *Tiberi, E. Rv.*
Sc.-Ind. 30 (1898) 216-.

— — — Central Physical Observatory. *Glasek,*
S. [1892] *St. Pet. Ac. Sc. Mm. (Rs.)* 71
 (1893) (*App. No.* 7) 32 pp.

— — — Fahrenheit. *Gamgee, A. Camb. Ph.*
S. P. 7 (1892) 95-.

— — —, divisions. *S. (vi Adds.) Thomson*
A. Ph. 8 (1816) 26-.

— — —, zero. *Cayley, G. Ph. Mg.* 5 (1829)
 88-.

— — —, new. *Forbes, G., & Preece, W. H. B.*
A. Rp. (1889) 514-.

— — —, reduction to scale of heat. *Flauger-*
gues, H. J. de Ps. 82 (1816) 386-; 83 (1816)
 209-.

— — —, standard. *Tittmann, O. H. Science*
 12 (1888) 58-.

— — —, unification. *Guillaume, C. É. Arch.*
Sc. Ps. Nt. 18 (1887) 341-.

— — — value of Joule's thermometers. *Schuster, A.*
Ph. Mg. 39 (1895) 477-.

Standard thermometers, comparison. *Benoit,*
J. R. [1889] *Par. Poids et Mes. Tr. Mm.*
 7 (1890) 132 pp.

— — — *Marek, W. Z. Instk.* 10 (1890)
 288-.

— — — *Guillaume, C. É. Par. Poids et*
Mes. Tr. Mm. 10 (1894) 33 pp.

— — —, construction. *Sheepshanks, R. As. S.*
M. Not. 11 (1850-51) 233-.

— — — at Kew. *Griffiths, E. H.* [1895]
Nt. 53 (1895-96) 39-.

— — — Glaisher's and Kew. *Ellis, W. Met.*
S. QJ. 3 (1877) 427-.

— — —, graduation at Kew. *Welsh, J. B. A.*
Rp. (1853) (*pt.* 2) 34-.

Temperatures, table. *Weyde, P. H. van der.*
Am. I. T. (1860-61) 557-.

Testing thermometers. *Bohnenberger, G. C.*
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— — — *Guillaume, C. É. Par. S. Ps. Sé.*
 (1890) 61.

— — — (clinical). *Schuster, A. Manch. Lt. Ph.*
S. Mm. & P. 8 (1894) 100-.

— — — *Anon. (? Kohlrusch, —.) Z. Instk.*
 18 (1898) 76-.

- Testing thermometers of glass. *Anon. C. Ztg.* 12 (1888) 1521.
 — (old glass). *Grützmacher, F.* Berl. Ps. Reichsanst. Ab. 3 (1900) 229-.
 — below ice point. *Schreiber, P.* Z. Instk. 8 (1888) 206-.
 — and spring barometers. *Schreiber, P.* Z. Instk. 6 (1886) 121-.
 — in temperatures up to 300°. *Loewenherz, —.* D. Nf. Vh. (1890) (Th. 2) 90-.
 Tests and tables. *Pernet, J., Jaeger, W., & Gumlich, E.* Berl. Ps. Reichsanst. Ab. 1 (1894) (App.) 3*-.
 Thermodynamic correction for air thermometer. *Rose-Innes, J.* Nt. 58 (1898) 77-.
 — — — — — *Orr, W. McF.* [1898] Nt. 59 (1898-99) 126.
 Thermometers used in determination of standard kilogram. *Marek, W. J.* Par. Poids et Mes. Tr. Mm. 1 (*1881) D. 4-; 2 (*1883) D. 5-; 3 (1884) D. 5-.
 —, verification. *Pîteaux, J.* [1896] Lyon S. Ag. A. 4 (1897) 1x-.
 — at freezing point of mercury. *Whipple, G. W.* L. Ps. S. P. 7 (1886) 283-; Ph. Mg. 21 (1886) 27-.
 Thermometric corrections. *Grützmacher, F.* A. Ps. C. 68 (1899) 769-.
 — fixed points. *Barus, C.* Am. Ac. P. 27 (1893) 100-.
 — — — — — *Holman, S. W., Lawrence, R. R., & Barr, L.* Am. Ac. P. 31 (1896) 218-.
 — — — — — *Griffiths, E. H.* Camb. Ph. S. P. 9 (1898) 224-.
 — and boiling point of water. *Broch, O. J.* Par. Poids et Mes. Tr. Mm. 1 (*1881) A. 41-.
 — — — — — transition points. *Richards, T. W.* Am. J. Sc. 6 (1898) 201-.
 — — — — — *Richards, T. W., & Churchill, J. G.* Am. Ac. P. 34 (1899) 275-.
 — standard, practical. *Callendar, H. L.* Ph. Mg. 48 (1899) 519-.
 Thermometry, boiling points for. *Holman, S. W., & Gleason, W. H.* Am. Ac. P. 23 (1888) 237-.
 —, Mills's researches. *Rücker, A. W., & Thorpe, T. E.* Ph. Mg. 12 (1881) 1-, 184-.
- Compressed air. *Kraft, J. I. CE. P.* 9 (1885) 311-.
 Compression, effects on thermal phenomena. *Hall, (Sir) J.* Nicholson J. 9 (1804) 98-; 13 (1806) 328-, 381-; 14 (1807) 13-, 113-, 196-, 302-.
 —, thermal effects on solids. *Joule, J. P. R. S. P.* 8 (1856-57) 564-.
 Dalton's and Gay-Lussac's laws deduced from equations of matter and energy. *Herran, A.* As. Fr. C. R. (1898) (Pt. 1) 134-.
 Density and pressure, relation. *Challis, J.* Ph. Mg. 17 (1859) 401-.
 Equilibrium laws, identity in physical, chemical and mechanical phenomena. *Le Chatelier, H.* Z. Ps. C. 1 (1887) 565-.
- EXPANSION.
- of bodies. *Schröder, H.* Pogg. A. 52 (1841) 282-.
 — — — — — *Volpicelli, P.* Rm. At. 4 (1850-51) 216-; 12 (1858-59) 349-; 13 (1860) 187-, 204-, 357-.
 — — — — — *Barré de Saint-Venant, —.* L'I. 23 (1855) 440-.
 — — — — — *Laurent, J. A.* Gén. Civ. 4 (1875) 150-.
 — — — — — *Cassani, P.* Ven. I. At. (1892-93) 1655-.
 — — — — — dynamical study. *Schweartze, T.* (xn) Ausl. 54 (1881) 1021-.
 — — — — — law. *Tessan, — de.* C. R. 50 (1860) 20-.
 — — — — — universal, relating to. *Lévy, M.* C. R. 87 (1878) 449-, 676-.
 — — — — — (Lévy). *Boltzmann, L.* C.E. 87 (1878) 593.
 — — — — — (Boltzmann). *Lévy, M.* C. R. 87 (1878) 649.
 — — — — — (Lévy). *Massieu, F.* C. R. 87 (1878) 731-.
 — — — — — (—). *Boltzmann, L.* C. R. 87 (1878) 773.
 — — — — — especially liquids. *Weilenmann, A.* Zür. Vjschr. 33 (1888) 37-.
 and compressibility, relation. *Grimaldi, G. P.* Rm. R. Ac. Line. Rd. 2 (1886) (Sem. 1) 238-.
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RELATIONS INVOLVING EXPANSION AND STRESS.

1400 General. (*See also* Chemistry
7245.)

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|---|---------------------------|--------------------------|--|------------------------------------|
| Adiabatic elastic constants. | <i>Voigt, W.</i> | <i>Gött.</i> | <i>Diesselhorst, H.</i> | Berl. Ps. Reichsanst. Ab. |
| Nr. (1888) 359—. | | | 3 (1900) 1—. | |
| Atmosphere, limits. | <i>Rudzikii, M.</i> | N. Rs. S. | — — — — — | and gases, law at high temperature |
| Nt. Mm. (<i>Mth.</i>) 15 (1893) 71—; Fschr. Ps. | | | <i>Dulong, P. L., & Petit, A. T.</i> | [1815] A. |
| (1893) (<i>Ab.</i> 1) 374. | | | C. 2 (1816) 240—. | |
| Avogadro's law for homogeneous liquids. | | | — — — — — | (Dulong and |
| <i>Traube, J.</i> | A. Ps. C. 61 (1897) 396—. | | <i>Petit, J. B.</i> | Par. S. Phlm. Bl. |
| Cohesion, elasticity, expansion and tempera- | | | (1815) 107—. | |
| ture. | <i>Forbes, G.</i> | [1876] Edinb. R. S. P. 9 | — sulphur (various modifications). | <i>Toepler, M.</i> |
| (1878) 141—. | | | A. Ps. C. 47 (1892) 169—. | |

- Gas laws, extension to homogeneous liquids. *Traube, J.* A. Ps. C. 61 (1897) 380-.
- Heat of compression of solids. *Spring, W.* Par. S. C. Bill. 41 (1884) 488-.
- — — and liquids. *Burton, C. I., & Marshall, W.* R. S. P. 50 (1892) 130-.
- , doctrine, particularly states of dense and elastic fluidity in bodies. *Astley, J.* Nicholson J. 5 (1802) 23-.
- and force, action on matter. *Dyer, J. C.* Manch. Ph. S. P. 3 (1862-63) 77-.
- Liquid and gaseous states. *Andrews, T.* [1886] Phil. Trans. (A) 178 (1888) 45-.
- Liquids and gases, theory. *Bakker, G.* Z. Ps. C. 12 (1893) 670-; 14 (1894) 446-; 17 (1895) 678-.
- solids at high temperatures. *Aitken, J.* (of Darroch). [1880] Nt. 23 (1881) 34-.
- Relations between different coefficients. *Amagat, —.* Par. S. Ps. Sé. (1897) 18*.-.
- Stretching, thermal effects on solids. *Joule, J. P.* R. S. P. 8 (1856-57) 355-.
- Temperature and calorific phenomena. *Pictet, R.* [1879] Laus. S. Vd. Bil. 16 (1880) 452-.
- , effect on glass. *Amagat, E. H.* C. R. 110 (1890) 1246-.
- , — mechanical properties of metals. *Le Chatelier, A.* Gén. Civ. 19 (1891) 59-, 73-, 107-.
- , — tenacity of iron wire. *Dufour, (gén.) G. H.* Bb. Un. 22 (1823) 220-.
- , — — metals. *Baudrimont, A.* Franklin I. J. 68 (1874) 37-.
- Thermo-elastic and thermal properties, relations. *Cornu, A.* J. de Ps. 2 (1873) 41-.
- Volume and specific heat, laws. *Phillips, S. E.* Nt. 30 (1884) 288-.
- Vulcanism. *Arrhenius, S.* Stockh. Gl. Förr. F. 22 (1900) 395-.

1410 Expansion of Solids by Heat.

(For Compressibility of Solids, see Mechanics, Elasticity 3200, etc.)

- Gilbert, L. W.* Gilbert A. 58 (1818) 281-.
- Galen, P. van.* Utr. A. Ac. (1826-27) 78 pp.
- Lechevalier, V.* Metz Mm. Ac. 10 (1828-29) 166-.
- Roberts, R.* B. A. Rp. (1850) (pt. 2) 16-.
- Pierre, J. I.* A. C. 33 (1851) 199-.
- Kopp, H.* Lieb. A. 81 (1852) 1-.
- Fick, A.* Pogg. A. 91 (1854) 287-.
- Kopp, H.* Lieb. A. 93 (1855) 129-; A. C. 47 (1856) 291-.
- Cuénoud, S.* [1860] Laus. Bil. S. Vd. 7 (1864) 160-.
- Dupré, A.* C. R. 59 (1864) 490-, 768-.
- Fizeau, H. L.* C. R. 62 (1866) 1101-, 1133-.
- Mousson, A.* Zür. Vjschr. 11 (1866) 175-.

- Fizeau, H. L.* C. R. 66 (1868) 1005-, 1072-.
- Hirsch, A.* Neuch. Bil. 8 (1870) 456-.
- Buff, H.* A. Ps. C. 145 (1872) 626-.
- Handl, A.* Wien Ak. Sb. 70 (1874) (Ab. 2) 505-.
- Kurz, A.* A. Ps. C. Ergän. 6 (1874) 314-.
- Glatzel, P.* A. Ps. C. 160 (1877) 497-.
- Russner, J.* Carl Rpm. 18 (1882) 655-.
- Pionchon, —.* [1889] C. R. 108 (1889) 992-; Bordeaux S. Sc. Mm. 5 (1890) xxii-.
- Coefficient of dilatation, theory. *Sayno, A.* Mil. I. Lomb. Rd. 23 (1890) 787-, 851-.
- Compensation of chronometers. *Cellérier, G.* Gen. S. Ps. Mm. 29 (1884-87) No. 6, 45 pp.
- pendulum. *Weber, R.* Neuch. S. Sc. Bil. 15 (1886) 169-.
- in signalling apparatus. *Hermand, —.* [1883] Gén. Civ. 4 (*1883-84) 124-.
- Deformation, elastic, of sphere, due to heat. *Almanst, E.* Tor. Ac. Sc. At. 32 (1896) 701- or 963-.
- of thin circular disc for temperature as continuous function of distance from centre. *Niemöller, F.* Z. Mth. Ps. 24 (1879) 270-.
- Elastic solid, stresses due to unequal temperature. *Hopkinson, J. B. A.* Rp. 42 (1872) (Sect.) 51-.
- Expansion by cold. *Rankine, W. J. M.* Ph. Mg. 8 (1854) 357-.
- at high temperatures. *Le Chatelier, H. C.* R. 107 (1888) 862-.
- low temperatures. *Mayer, A. M.* [1886] Am. J. Sc. 40 (1890) 323-.
- — — *Zakrzewski, J.* Krk. Ak. (Mt.-Prz.) Rz. 20 (1890) 227-; Crc. Ac. Sc. Bil. (1889) No. 10, xix-.
- surface of separation of 2 solids. *Heen, P. de.* Liège S. Sc. Mm. 18 (1895) No. 2, 6 pp.
- Expansive force of substances. *Lagerhjelm, P.* Stockh. Ak. Hndl. 48 (1827) 164-.
- Glass for apparatus, to stand heating. *Winkelmann, A., & Schott, O.* Z. Instk. 14 (1894) 6-.
- Heat resulting from sudden cooling of solid body. *Mousson, A.* Bb. Un. 12 (1837) 418-.
- Influence of pressure. *Puschl, K.* [1875] Wien Ak. Sb. 72 (1876) (Ab. 2) 245-.
- residual viscosity. *Day, H. D.* Am. J. Sc. 2 (1896) 342-.
- Interference dilatometer, compensated. *Tutton, A. E.* Phil. Trans. (A) 191 (1898) 313-.
- Invariable pendulum, construction. *Koch, K. R.* D. Nf. Vh. (1899) (Th. 2, Hälfte 1) 39-.
- Isotropic body, free expansion. *Zehfuss, G.* Schölmilch Z. 8 (1863) 127-.
- Lengths of bars at temperature of melting ice. *Flint, A. R., Voigt, W., Wheeler, E. S., & Woodward, R. S.* Am. J. Sc. 25 (1883) 448-.
- Marine chronometers and watches, influence of temperature. *Birkenmajer, L.* Krk. Ak. (Mt.-Prz.) Rz. 10 (1896) 357-; Crc. Ac. Sc. Bil. (1896) 78-.

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- Tralles, J. G.* Berl. Mm. Ac. (1804) 12-.
- Mather, W. W.* Silliman J. 30 (1836) 324-.
- Steinheil, C. A. von.* Münch. Bl. Ak. (1843) 225-.
- Grunert, J. A.* Grunert Arch. 6 (1845) 443-.
- Krist, J.* Carl Rpm. 2 (1867) 65-.
- Müller, Joh.* A. Ps. C. 135 (1868) 672-.
- Schellen, H.* Carl Rpm. 5 (1869) 326-.
- Müller, Joh.* Freiburg B. 5 (1870) (Heft 1) 81-.
- Wild, H.* Arch. Sc. Ps. Nt. 41 (1871) 373-.
- Reusch, F. E. von.* Carl Rpm. 13 (1877) 1-.
- Thoulet, J.* C. R. 98 (1884) 620-.
- Artimini, F.* Rv. Sc.-Ind. 18 (1886) 113-.
- Benoit, R. J.* de Ps. 8 (1889) 253-, 451-.
- Morley, F. W.* Am. As. P. (1891) 137-.
- Le Chatelier, —, & Coupeau, —.* Par. S. Ps. Sé. (1898) 3*.
- Vandevyver, L. N.* Brux. Ac. Bil. 35 (1898) 551-.
- Darwin, H.* Nt. 60 (1899) 149.
- by comparator. *Steinheil, C. A. von.* Münch. Sb. (1870) (I) 1-.
- , Lenoir's. *Prony, R. de.* Bb. Brit. 19 (1802) 301-.
- , screw. *Pernet, J.* Arch. Néerl. 5 (1900) 395-.
- dilatometer, *Abbe-Fizeau.* *Pulfrich, C. Z.* Instk. 13 (1893) 365-, 401-, 437-.
- influence of change of temperature due to the expansion. *Miller, A.* [1883] Münch. Ak. Sb. 13 (1884) 17-; A. Ps. C. 20 (1883) 94-.
- by interference. *Biertliet, A. van.* Brux. S. Sc. A. 12 (1888) (Pt. 2) 215-.
- Newton's rings (thernomicrometer). *Jerichau, E. B.* Sk. Nt. F. 2 (1840) 234-; A. C. 4 (1842) 363-.
- pendulum. *Weber, R. C. R.* 103 (1886) 553-; *Neuch. S. Sc. Bll.* 15 (1886) 177-.
- , *Guillaume, C. É.* C. R. 103 (1886) 689-; Arch. Sc. Ps. Nt. 16 (1886) 393-.
- , *Sečnikov, P. I.* Kazan S. Nt. (Ps.-Mth.) P. 7 (1889) 3.
- , horizontal, to observe minute changes in dimensions. *Rood, O. N.* Am. J. Sc. 9 (1875) 444-.
- photography. *Le Chatelier, —.* [1888] S. C. In. J. 8 (1889) 638.
- in relation to standards. *Bosscha, —.* A. Cons. Arts et Mét. 10 (*1873) 76-.
- , —, *Benoit, J. R.* Par. Poids et Mes. Tr. Mm. 2 (*1883) C. 1-, C. 1-; 3 (1884) C. 1-, C. 1-.
- , —, *Sadebeck, M.* Lpldina. 19 (1883) 141-.
- , —, *Rogers, W. A.* Am. S. Mer. P. (1887) 5-.
- terms of wave lengths. *Rogers, W. A.* Am. Mer. S. T. 17 (1895) 305-.

Molecular changes produced by changes of temperature in solids. *Duhamel, J. M. C.* Par. Mm. Sav. Étr. 5 (1838) 440-.

- Monument (Bunker Hill), effect of heat on perpendicularity. *Horsford, E. N.* Am. As. P. (1851) 81-.
- Phenomena accompanying change of volume in solids. *Edlund, E.* Stockh. Öfv. 18 (1861) 119-; *Pogg. A.* 114 (1861) 1-.
- Relation between thermal and elastic phenomena. *Kupffer, A. T.* St. Pét. Ac. Sc. Bl. 14 (1856) 273-, 289-.
- , —, —, *Mai, E.* Mil. I. Lomb. Rd. 24 (1891) 1050-.
- , —, expansion and melting point. *Freuchen, P., & Poulsen, V.* N. Ts. Fs. K. 1 (1896) 45-; C. Ztg. 20 (1896) (Rpm.) 125-.
- , —, melting point and elasticity. *Sayno, A.* Mil. I. Lomb. Rd. 24 (1891) 574-.
- , —, temperature, and torsion modulus. *Sayno, A.* Mil. I. Lomb. Rd. 24 (1891) 293-.
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- , *Le Chatelier, H.* C. R. 128 (1899) 1444-.
- , measurement of expansion. *Hockin, C., & Matthiessen, A.* Lib. 1 (1867) 89-, 149-.
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- Alums, measurement of expansion by dilatometer. *Spring, W.* Brux. Ac. Bil. 6 (1883) 685-; Berl. B. 17 (1884) 408-.
- Baily's metal, Jessup's steel and Chance's glass. *Rogers, W. A.* Am. As. P. (1887) 80-.
- Bismuth amalgams, contraction. *Vicentini, G., & Cattaneo, C.* Rm. R. Ac. Linc. Rd. 7 (1891) (Sem. 2) 95-.
- Brick-tower, daily motion caused by solar heat. *Rockwood, C. G.* Am. As. P. 20 (1871) 171-.
- Brickwork. *Hawkes, W.* Br. Archt. I. Pp. (1861) 121-.
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- Ceramic pastes and glazes. *Le Chatelier, H.* S. C. In. J. 14 (1895) 751.
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- Crystals. *Mitscherlich, E.* Berl. Ab. (1825) 201-; Berl. B. (1837) 69-.
- , *Hahn, H. C.* (xii) Arch. Phm. 148 (1859) 19-.
- , *Moutier, J.* Par. S. Phlm. Bil. 2 (1878) 78-.
- , *Blasius, E.* A. Ps. C. 22 (1884) 528-.
- , form in relation to expansion. *Mitscherlich, E.* Pogg. A. 1 (1824) 125-.
- , glauberite. *Brewster, (Sir) D.* Ph. Mg. 1 (1832) 417-.
- and other solids, measurement of expansion. *Voigt, W.* A. Ps. C. 43 (1891) 831-.

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— and euprous oxide. *Fizeau, H. L.* C. R. 60 (1865) 1161-.

Ebonite. *Kohlrausch, F.* A. Ps. C. 149 (1873) 577-.

Glass. *Bellani, A.* Brescia Cm. (1823) 57-; *Brugnatelli G. 6* (1823) 20-, 217-, 274-.

— *Crichton, J.* Thomson A. Ph. 7 (1824) 241-.

— *Regnault, V.* A. C. 4 (1842) 64-.

— *Crafts, J. M.* C. R. 91 (1880) 413-.

— *Thiesen, M., & Scheel, K.* Z. Instk. 12 (1892) 293-; 13 (1893) 76.

— *Baudin, L. C.* C. R. 116 (1893) 971-.

— *Winkelmann, A., & Schott, O.* [1893] A. Ps. C. 51 (1894) 730-.

— *Granger, A.* Mon. Sc. 12 (1898) 681-.

—, expansion in relation to chemical composition. *Grenet, L. C. N.* 76 (1897) 101-.

Gypsum. *Beckenkamp, J.* A. Ps. C. Beibl. (1882) 650-.

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— *Larsson, H., & Pettersson, O.* Stockh. Öfv. 36 (1880) No. 3, 65-.

— *Andrews, T.* R. S. P. 40 (1886) 544-.

— *Nichols, E. L.* P. Rs. 8 (1899) 184-.

—, action on pile bridge, Rice Lake (Canada). *Clarke, T. C.* Cn. J. 3 (1854-55) 249-.

—, expansion and contraction. *Dumble, J. H.* Cn. J. 3 (1858) 414-; 5 (1860) 418-.

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— *Puschl, K.* Wien Ak. Sb. 71 (1875) (Ab. 2) 95-.

— *Lebedev, I.* (xn) Rs. Ps.-C. S. J. 13 (Ps.) (1881) [(Pt. 1)] 246-.

— *Lundal, A. E.* A. Ps. C. 66 (1898) 741-.

— *Cantone, M., & Contino, G.* Mil. I. Lomb. Rd. 33 (1900) 215-.

—, analogy with gelatin. *Bjerkén, P. von.* A. Ps. C. 43 (1891) 817-.

—, contraction. *Gezekhus [Hesehus], N. A.* (xn) Rs. Ps.-C. S. J. 15 (Ps., Pt. 1) (1883) 103-; J. de Ps. 3 (*1884) 459-.

—, elasticity and expansion. *Graetz, L.* A. Ps. C. 28 (1886) 354-.

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—, stretched, behaviour when heated. *Schmulewitsch, J.* Zür. Vjschr. 11 (1866) 201-.

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—, —, — *Schmulewitsch, J.* [1869] St. Pét. Ac. Sc. Bll. 14 (1870) 517-.

—, —, — *Thomas, P.* Les Mondes 19 (1869) 575-.

—, —, — (Thomas). *Govi, G.* Les Mondes 19 (1869) 640-.

—, —, — (Govi). *Thomas, P.* Les Mondes 20 (1869) 8-.

India-rubber, stretched, behaviour when heated. *Madan, H. G.* Nt. 32 (1885) 625.

— and wires, expansion and extensibility, relations. *Kurz, A.* Exner Rpm. 22 (1886) 547-; 27 (1891) 631-.

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—, cast. *Mushet, D.* Tilloch Ph. Mg. 18 (1804) 1-.

—, — *Mallet, R.* Franklin I. J. 69 (1875) 156-.

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— — — at high temperatures. *Le Chatelier, H.* C. R. 129 (1899) 331-.

— — — — welding temperatures. *Wrightson, T.* [1895] Phil. Trans. (A) 186 (1896) 593-.

— — — — zinc, determination of expansion. *Börsch, A.* As. Nr. 99 (1881) 177-.

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— and alloys. *Matthiessen, A.* Phil. Trans. 156 (1866) 861-.

— — — *Hirsch, A.* Neuch. S. Sc. Bll. 16 (1888) 298-.

— — — and salts. *Crace-Calvert, F. B. A.* Rp. (1858) (pt. 2) 46-.

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—, — — by interference. *Morley, E. W., & Rogers, W. A.* Ps. Rv. 4 (1897) 1-, 106-.

—, quasi-isotropic, expansion and pressure. *Voigt, W.* Gött. Nr. (1893) 177-.

—, in relation to temperature of fusion. *Lémeray, —.* C. R. 131 (1900) 1291-.

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- , incandescence. *Nichols, E. L.* *Am. As. P.* (1881) 24-.
- , platinumiridium, palladium, silver, nickel, iron, steel and constantan at high temperatures. *Holborn, L., & Day, A.* *Berl. Ak. Sb.* (1900) 1009-.
- Porcelain. *Bedford, T. G.* *B. A. Rp.* (1899) 245; *L. Ps. S. P.* 17 (1901) 148-; *Ph. Mg.* 49 (1900) 90-.
- , Bayeux (between 1000° and 1500°). *Sainte Claire-Deville, H., & Troost, L.* *C. R.* 59 (1864) 162-.
- Pottery clay mass. *Granger, A.* *Mon. Sc.* 13 (1899) 5-.
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- Rock crystal. *Fizeau, H. L.* *C. R.* 58 (1864) 923-; *A. C.* 2 (1864) 143-.
- Rocks. *Halloek, W.* *U. S. G. Sv. Bll. No.* 78 (1891) 109-.
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- containing water of crystallisation. *Wiedemann, E. E. G.* *A. Ps. C.* 17 (1882) 561-.
- Silica, fused. *Le Chatelier, H.* *C. R.* 130 (1900) 1703-.
- Silver chloro-brom-iodides. *Rodwell, G. F.* [1876] *R. S. P.* 25 (1877) 292-.
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- , bromide, and chloride. *Rodwell, G. F.* [1876] *R. S. P.* 25 (1877) 280-.
- , —, —, and some chloro-brom-iodides of silver. *Rodwell, G. F.* *R. S. P.* 31 (1881) 291-.
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- , measurement of expansion. *Hirsch, A., & Plantamour, E.* *Arch. Sc. Ps. Nt.* 38 (1870) 37-; 40 (1871) 9-.
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- and potassium and their alloy. *Hagen, E. B.* [1882] *A. Ps. C.* 19 (1883) 436-.
- Speculum metal for gratings, measurement of expansion. *Rogers, W. A.* *Am. As. P.* (1884) 116-.
- Standard 10 ft. iron bar of Indian survey and gold, silver and copper. *Prinsep, J.* *Beng. J. As. S.* 2 (1833) 130-.
- Steel and argentine, measurement of expansion by Fizeau's apparatus. *Ascoli, M.* *Rm. R. Ac. Linc. Mm.* 1 (1894) 150-.
- , Jessup's, measurement of expansion. *Morley, E. W., & Rogers, W. A.* *Am. As. P.* (1891) 138-; *Science* 2 (1895) 351.
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- , expansion and contraction. *Bartlett, W. H. C.* *Silliman J.* 22 (1832) 136-.
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- — — solids. *Fizeau, H. L.* *Les Mondes* 20 (1869) 137-.
- — — —. *MacGregor, J. G.* [1888] *Cn. R. S. P. & T.* 6 (1889) (Sect. 3) 3-.
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- , — — physical properties of metals. *Le Chatelier, A.* *C. R.* 110 (1890) 705-.
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- , —, irreversible expansion. *Guillaume, C. É. C. R.* 126 (1898) 738-.
- , —, properties. *Guillaume, C. É. Par. S. Ps. Sé.* (1897) 120-.
- Permanent deformations and hysteresis. *Duhem, P. Brux. Mm. Cour.* 4^o, 54 (1896) No. 4, 61 pp.
- , —, modifications, general theory. *Duhem, P. Brux. Mm. Cour.* 4^o, 54 (1896) No. 6, 55 pp.

- Permanent modifications of sulphur. *Duhem, P. Brux. Mm. Cour.* 4^o, 54 (1896) No. 5, 86 pp.
- Railway axles, effect of temperature on strength. *Andrews, T. I. CE. P.* 87 (1886) 340-; 94 (1888) 180-; 105 (1891) 161-.

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- and magnetism. *Hopkinson, J. R. S. P.* 48 (1891) 442-.
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- , *Thomson, E. Tel. J.* 24 (1889) 616-.

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- ("Bologna phial.") *Morozzo, C. L. (conte) de.* [1876] *Turin Mm. Ac.* 3 (1786-87) 449-.
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- Biot, J. B. Par. S. Phlm. Bll.* (1815) 122-.
- Helwig, C. G. von. Gilbert A.* 51 (1815) 112-.
- Merian, P. Meisner A.* 1 (1824) 133-.
- (Breaking of vessel filled with water, by explosion.) *Bellant, A. A. Sc. Lomb. Ven.* 5 (1835) 298-.
- Cagniard-Latour, C. Par. S. Phlm. PV.* (1837) 118-.
- (Breaking of glass vessels by explosion.) *Mazzoli, A. A. Sc. Lomb. Ven.* 7 (1837) 153-.
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- Reusch, E. A. Ps. C.* 130 (1867) 494-.
- Dufour, L. Arch. Sc. Ps. Nt.* 34 (1869) 125-; *C. R.* 68 (1869) 398-.
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- , —, — thermal and mechanical treatment on structure. *Sauveur, A. I. & S. I. J.* (1899) (No. 2) 195-.
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- , —, (Howe). *Osmond, F. I. & S. I. J.* (1896) (No. 1) 180-.
- , —, *Howe, H. M. I. & S. I. J.* (1897) (No. 1) 193-.
- , — and tempering. *Roberts-Austen, W. C.* [1889] *Nt.* 41 (1890) 11-, 32-.

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—, —, —, —, *Rydberg, C. F.* [1887]

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6, 25 pp.; *Fschr. Ps.* (1887) (*Ab.* 1) 465-.

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— metal wires, and heat. *Haga, H.* [1881]

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— — — —, and resulting double refraction.

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- and water. *Rosenberg, B.* (xii) Rs. C. Ps. S. J. 9 (*Ps.*) (1877) [(*Pt.* 1)] 129-.
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- methyl formate. *Kosonogov, I. I.* [1889-90] Kiev S. Nt. Mm. 11 (1) (1890) xlix-, lxxv-; Rs. Ps.-C. S. J. 22 (*Ps.*) (1890) 95; J. de Ps. 10 (1891) 432.
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- — organic liquids. *Heen, P. de.* [1879] Brux. Mm. Cour. 8°, 31 (1881) (No. 4) 51 pp.
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- , —. *Tardy de la Brossy, —.* Bb. Brit. 29 (1805) 22-; 31 (1806) 305-; 41 (1809) 296-.
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- , —. *Avogadro, A.* Brugnatelli G. 1 (1818) 351-.
- , —. *Stampfer, S.* Wien Jb. Pol. I. 16 (1830) 1-.
- , —. *Tredgold, T.* CE. I. T. 1 (1836) 141-.
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- (below +4° R.). *Weidner, (Dr.) —.* A. Ps. C. 129 (1866) 300-.
- , —. *Guldberg, C. M.* Christiania F. 12 (1869) 1-.
- , —. *Morton, A.* (x) Glasg. I. Eng. T. 15 (1872) 135-.
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- , —. *Veress, V.* (xii) Orv.-Term. Éts. 4 (1879) (*Term. Szak*) 85-.
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- , —. *Chappuis, P.* Par. Poids et Mes. PV. (1892) 139-.
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- , tables. *Scheel, K.* Z. Instk. 17 (1897) 331-; 18 (1898) 32.

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- liquids as introduction to terrestrial physics. *De Luc, J. A.* A. C. 48 (1803) 138-, 273-; 49 (1804) 84-, 118-, 225-; 54 (1805) 156-, 229-.
- Glaciers, curious phenomenon. *Rumford, B. (Count).* [1803] Phil. Trans. (1804) 23-.
- De Heen's equations, experimental verification. *Grimaldi, G. P.* Rm. R. Ac. Linc. Rd. 2 (1886) (Sem. 1) 244-; *J. de Ps.* 7 (1888) 72-.
- for members of homologous series. *Bartoli, A., & Stracciati, E.* N. Cim. 18 (1885) 107-.
- Impelling power of moving water, effects of changes of temperature. *Wagner, S.* Silliman J. 8 (1824) 393-.
- Laws of expansion and compressibility of water, and maximum density of water. *Amagat, E. H.* Par. S. Ps. Sé. (1893) 145-.
- Liquid state, theory. *Heen, P. de.* A. C. 5 (1885) 83-.
- Liquids, thermal behaviour. *Ramsay, W., & Young, S.* Ph. Mg. 37 (1894) 215-, 503-.
- , —. *Galitzine, B.* Ph. Mg. 37 (1894) 423.
- , —. *Heen, P. de.* Ph. Mg. 37 (1894) 424, 584.
- , —. *Battelli, —.* Ph. Mg. 38 (1894) 245-.

MAXIMUM DENSITY OF LIQUIDS, TEMPERATURE.

- alcohol and water. *Coppet, L. de.* C. R. 115 (1892) 652-, 1346.
- alcoholic mixtures. *Rossetti, F.* Ven. At. 15 (1869-70) 1297-; C. R. 70 (1870) 1092-.
- aqueous methyl alcohol. *Moretto, P.* N. Cim. 6 (1897) 198-.
- solutions. *Coppet, L. C. de.* C. R. 131 (1900) 178.
- of ether. *Nort, H.* Mbl. Nt. (1895-96) 79-; *Fachr. Ps.* (1896) (Ab. 2) 250.
- barium chloride solutions. *Coppet, L. C. de.* C. R. 125 (1897) 533.
- saline solutions (between 100° and 150°). *Zepernick, K., & Tammann, G.* Z. Ps. C. 16 (1895) 659-.
- , —. *Coppet, L. C. de.* C. R. 128 (1899) 1559-.
- and their freezing point. *Lussana, S., & Bozzola, G.* Ven. I. At. (1892-93) 785-.
- sea water. *Erman, A.* A. C. 38 (1828) 287-.
- , —. *Hope, T. C.* [1838] Edinb. R. S. T. 14 (1840) 242-.
- sugar solutions. *Coppet, L. C. de.* A. C. 3 (1894) 268-.
- water. *Rumford, B. (Count).* Gilbert A. 1 (1799) 436-.
- , *Hällström, G. G.* Gilbert A. 17 (1804) 107-.
- , *Rumford, B. (Count).* [1805] Par. Mm. de l'I. (1806) (Sem. 1) 78-.
- , *Tardy de la Brossy, —.* Bb. Brit. 32 (1806) 332-; 34 (1807) 193-.
- , *Pictet, M. A.* Bb. Brit. 34 (1807) 113-.

- water. *Sym, G. O.* Thomson A. Ph. 9 (1817) 387-.
- , *Crichton, J.* Thomson A. Ph. 5 (1823) 401-.
- , *Hällström, G. G.* Stockh. Ak. Hndl. (1823) 193-; A. C. 28 (1825) 56-; Stockh. Ak. Hndl. (1824) 1-.
- , *Moll, G.* Amst. N. Vh. 1 (1827) 241-.
- , *Stampfer, S.* Wien Jb. Pol. I. 16 (1830) 1-.
- , *Hällström, G. G.* Stockh. Ak. Hndl. (1833) 166-; *Pogg. A.* 34 (1835) 220-.
- , *Joule, J. P., & Playfair, L.* [1846] Ph. Mg. 30 (1847) 41-.
- , *Exner, F.* Wien Sb. 68 (1873) (Ab. 2) 463-.
- , *Tait, P. G.* [1883] Edinb. R. S. P. 12 (1884) 226-.
- , *Vernon, H. M.* Ph. Mg. 31 (1891) 387-.
- , *Coppet, L. C. de.* Laus. S. Vd. Bl. 29 (1893) 1-; A. C. 3 (1894) 246-.
- , distilled, and sea water. *Weber, L. D.* Meere Jbr. 4, 5 & 6 (1878) 1-.
- , influence of pressure. *Puschl, K.* [1875] Wien Ak. Sb. 72 (1876) (Ab. 2) 283-.
- , —, —. *Waals, J. D. van der.* Amst. Ak. Vs. M. 11 (1877) 119-; Arch. Néerl. 12 (1877) 457-.
- , —, —. *Marshall, D. H., Smith, C. M., & Omond, R. T.* Edinb. R. S. P. 11 (1882) 626-, 809-.
- , —, —. (Marshall, Smith and Omond).
- , *Tait, P. G.* Edinb. R. S. P. 11 (1882) 813-.
- , —, —. *Grimaldi, G. P.* Gz. C. It. 15 (1885) 297-.
- , —, —. *Amagat, E. H.* C. R. 104 (1887) 1159-; 116 (1893) 946-.
- , mechanical explanation. *Piarron de Mondésir, —.* C. R. 77 (1873) 1154-.
- and saline solutions. *Rossetti, F.* Ven. At. 12 (1866-67) 73-; 13 (1867-68) 1047-, 1419-; 17 (1869) 370-.
- , —, —, influence of pressure. *Lussana, S.* N. Cim. 2 (1895) 233-.
- sulphuric acid mixtures. *Kohlrausch, F.* A. Ps. C. Ergänz. 8 (1878) 675-.

- Molecular volumes and thermal expansion of liquids at corresponding temperatures. *Bartoli, A.* Rm. R. Ac. Linc. Mm. 19 (1884) 577-.
- Pressure, volume and temperature relations. *Grimaldi, G. P.* Z. Ps. C. 1 (1887) 550-; 2 (1888) 374-.
- , —, —. *Barus, C.* Am. J. Sc. 38 (1889) 407-; 39 (1890) 478-.
- , —, —. *Amagat, E. H.* C. R. 118 (1894) 566-.
- , —, —. — during dissociation. *Waals, J. D. van der.* Amst. Ak. Vs. M. 15 (1880) 199-; A. Ps. C. Beibl. 4 (1880) 749-.
- Volume of liquids as function of temperature at high pressures. *Zhuk [Žuk], K. N.* [1881-96] (xn) Rs. Ps.-C. S. J. 13 (Ps.) (1881) 239-, 411-; 16 (Ps.) (1884) 304-; (xi) A. Ps. C. Beibl. 6 (1882) 86-; (xii) Kiev S. Nt. Mm. 7 (1884) lxxxvi-; 16 (I) (1899) xii-.

1450 Expansion of Gases

- Volume and pressure relation of solutions. *Tammann, G.* Z. Ps. C. 17 (1895) 620-.
- , temperature of bodies, especially liquids. *Weilenmann, A.* Zür. Vjschr. 33 (1888) 37-.
- Water, adiabatics and isothermals. *Rücker, A. W.* R. S. P. 22 (1874) 451-.
- , —, (near maximum density point). *Peddie, W.* Edinb. R. S. P. 12 (1884) 933-.
- , expansion and contraction. *Crane, W.* Tilloch Ph. Mg. 38 (1811) 54-.
- , —, pressure coefficient. *Amagat, E. H.* C. R. 116 (1893) 779-.
- , phenomenon depending on different densities. *Surdi, D.* (xii) Rv. Sc.-Ind. 7 (1875) 145-.
- Weight thermometer, temperature compensation. *Wild, H.* St. Pét. Ac. Sc. Bll. 15 (1871) 139-; 16 (1871) 132-.
- Work of internal expansion in liquid mixtures. *Drecker, J.* A. Ps. C. 20 (1883) 870-.

1450 Expansion of Gases and Unsaturated Vapours: Pressure-Volume-Temperature Relations.

(See also Chemistry 7160.)

- Adiabatic relation. *Moutier, J.* A. C. 7 (1876) 318-.
- , —, *Antoine, C.* C. R. 105 (1887) 1242-.
- , ether. *Ramsay, W., & Perman, E. P.* R. S. P. 49 (1891) 447.
- , —, *Perman, E. P., Ramsay, W., & Rose-Innes, J.* [1896] Phil. Trans. (A) 189 (1897) 167-.
- , modification for gaseous jet. *Parenty, H.* C. R. 113 (1891) 791-.
- Aëriforms, law of volume extended to dense bodies. *Macvicar, J. G.* Edinb. R. S. T. 23 (1864) 581-.
- Air and coal gas, explosion constants of mixtures. *Witz, A.* C. R. 100 (1885) 1131-.
- , composition, conflicting results. *Leduc, A.* C. R. 111 (1890) 262-.
- , compressed, efflux. *Salcher, P., & Whitehead, J.* [1888] Wien Ak. Sb. 98 (1890) (Ab. 2a) 267-.
- , —, new phenomena. *Armellini, T.* Rm. At. N. Linc. 25 (1872) 94-.
- , compression in air-bubble under water. *Tait, P. G.* Edinb. R. S. P. 5 (1866) 563-.
- , condensation and rarefaction, applications. *Fränkel, W.* Dresden Sb. Isis (1868) 42-.
- , heated, slightly compressed, use. *Miller, J. A.* (vi Adds.) Am. I. T. (1863-64) 586-.
- , Pascal's experiments on weight. *Thurot, C. J.* de Ps. 1 (1872) 267-.
- , pressure variometer, *Hefner-Alteneck, Weber, L.* [1896] Schl.-Holst. Nt. Vr. Schr. 11 (1898) 9.
- , pump, limit of rarefaction. *Deventer, J. G. van.* Batav. Ntk. Ts. 56 (1897) 183-.
- , variable pressure under piston. *Golicyn, (Prince) B. B.* St. Pét. Ac. Sc. Bll. 5 (1896) xi-; 7 (1897) 409-.

Boyle's Law 1450

- Atmosphere, density and pressure. *Speer, T. C.* Tilloch Ph. Mg. 33 (1809) 417-.
- , height. *Minary, E.* [1889] Doubs S. Mm. 4 (1890) 221-.
- , volume. *Hill, G. W.* Des Moines Anal. 4 (1877) 97-.
- Avogadro's law. *Blaserna, P.* Gz. C. It. 1 (1871) 64-.
- , *Leduc, A.* C. R. 124 (1897) 285-.
- , analogue. *Groshans, J. A.* Mon. Sc. 24 (1882) 1027-.
- Balloon problem: expanding gas. *Paradox (Pseud.)* Science 19 (1892) 136-.
- Barothermoscope and absolute millesimal scale. *Salomon, F.* Z. Angew. C. (1894) 687-.

BOYLE'S (OR MARIOTTE'S) LAW.

- Arnim, L. A. von.* Gilbert A. 2 (1799) 238-.
- Ampère, A. M.* [1814] A. C. 94 (1815) 145-.
- Örsted, H. C., & Suensson, (Capt.)* —. Kiøb. Ov. (1824-25) 13-.
- Örsted, H. C.* Schweigger J. 45 (=Jb. 15) (1825) 352-.
- Exley, T.* Thomson Rc. 4 (1836) 336-.
- Regnault, V.* Bb. Un. Arch. 2 (1846) 66-.
- Hunt, E. B.* Silliman J. 9 (1850) 412-.
- Wilbraham, H.* Camb. and Dubl. Mth. J. 6 (1851) 167-.
- (at pressure below an atmosphere.) *Siljeström, P. A.* [1873-74] (xi) Stockh. Ak. Hndl. Bk. 2 (1873-75) No. 1, 54 pp., No. 10, 21 pp. (Siljeström.) *Mendelejeff, D. I.* Berl. B. 7 (1874) 1339-.
- (Mendelejeff.) *Siljeström, P. A.* Berl. B. 8 (1875) 576-.
- (Siljeström.) *Mendelejeff, D. I.* Berl. B. 8 (1875) 744-.
- Gosiewski, W.* Par. T. Nauk Śc. Pam. 9 (*1877) Art. 4, 4 pp.; 11 (*1879) Art. 6, 3 pp.; Z. Mth. Ps. 22 (1877) 336-.
- Mendelejeff, D. I.* Nt. 15 (1877) 455-, 498-.
- apparatus. *Volpicelli, P.* Rm. At. 10 (1856-57) 181-, 393-, 430-; 11 (1857-58) 55-, 133-, 206-; 12 (1858-59) 28-, 76-, 276-.
- , *Hagen, E. B.* (xii) Z. Instk. 2 (1882) 252-.
- , *Thomas, B. F.* Am. As. P. (1883) 136-.
- , *Piarron de Mondésir, —.* Par. Ing. Civ. Mm. (1887) (Pt. 1) 267-.
- , *Rheam, W.* Nt. 49 (1893-94) 433.
- deduced from theoretical principles. *Mayer, J. T.* [1824] Gött. Cm. 6 (1823-27) 3-.
- and definition of density. *Uylenbroek, P. J.* Amst. I. (1841) 114-.
- deviations. *Kolk, H. W. S. van der.* Pogg. A. 116 (1862) 429-.
- , *Amagat, E. H.* C. R. 68 (1869) 1170-; Arch. Sc. Ps. Nt. 35 (1869) 169-.
- , *Budde, E.* J. Pr. C. 9 (1874) 30-.
- , *Winkelmann, A. A.* A. Ps. C. 5 (1878) 92-.
- , at low pressures (oxygen). *Bohr, C.* [1885] Kjöb. Dn. Vd. Selsk. Skr. 2 (1881-86) 401-; A. Ps. C. 27 (1886) 459-.
- effect of moisture. *Dubrunfaut, —.* C. R. 68 (1869) 1262-.

at high temperature. *Puschl*, C. Wien Ak. Sb. 97 (1889) (*Ab. 2a*) 142-; *Mh. C.* (1888) 93-.

— low pressure. *Fuchs*, F. A. Ps. C. 35 (1888) 430-.

— —. *Sutherland*, W. Ph. Mg. 43 (1897) 11-.

— —. *Battelli*, —. Rv. Sc.-Ind. 32 (1900) 210-.

pressure less than an atmosphere. *Ven*, E. van der. A. Ps. C. 38 (1889) 302-; *Haarl.* Ms. Teyl. Arch. 3 (1892) 349-, 589-.

Calorific and expansive properties of elastic fluids. *Reech*, F. C. R. 46 (1858) 84-; 56 (1863) 1240-; 57 (1863) 505-.

Cartesian diver. *Bauer*, K. L. A. Ps. C. (*Erg.* 6) (1874) 332-.

— —. *Rebenstorff*, H. Dresden Isis Sb. (1900) (*Ab.*) 3-.

CHANGE OF TEMPERATURE ACCOMPANYING CHANGE OF VOLUME.

Dalton, J. [1800] Manch. Ph. S. Mm. 5 (1802) (*Pt.* 2) 515-.

Wrede, E. F. Gilbert A. 44 (1813) 111-.

Navier, C. L. M. H. Par. S. Phlm. Bil. (1820) 97-.

Henry, J. [1825] Alb. I. T. 1 (*1830) (*Pt.* 2) 36.

Ivory, J. Ph. Mg. 1 (1827) 89-, 165-.

(*Ivory*.) *Meikle*, H. QJ. Sc. (1828) (*Pt.* 2) 124-.

(*Meikle*.) *Ivory*, J. Ph. Mg. 4 (1828) 321-.

(*Ivory* and *Meikle*.) *Anon.* (vi 1064) QJ. Sc. (1829) (*Pt.* 1) 277-.

Ewart, P. Ph. Mg. 5 (1829) 247-.

Joule, J. P. [1844] Ph. Mg. 26 (1845) 369-.

Rankine, W. J. M. Edinb. N. Ph. J. 51 (1851) 128-.

Assmann, C. Pogg. A. 85 (1852) 1-.

Koosen, J. H. Pogg. A. 89 (1853) 437-.

Cazin, A. A. C. 66 (1862) 206-.

Dupré, A. A. C. 67 (1863) 359-; C. R. 58 (1864) 539-.

Cantoni, G. Mil. I. Lomb. Rd. 4 (1867) 135-.

Moutier, J. C. R. 68 (1869) 95-; 69 (1869) 1137-.

Regnault, V. C. R. 69 (1869) 780-; Par. Ac. Sc. Mm. 37 (*pt.* 2) (1870) 579-.

Heath, (Rev.) J. M. Ph. Mg. 39 (1870) 288-.

Regnault, V. A. C. 24 (1871) 342-.

Jamin, J., & *Richard*, —. C. R. 75 (1872) 105-, 453-.

Thurston, R. H. Franklin I. J. 67 (1874) 267-.

Heath, (Rev.) J. M. Ph. Mg. 4 (1877) 14-.

Schmidt, G. Dingler 238 (1880) 267-, 361-.

Tait, P. G. [1881] Edinb. R. S. P. 11 (1882) 51-, 217-.

Rivière, C. J. de Ps. 3 (1884) 473-.

Natanson, E. Kosmos (Lw.) 12 (1887) 415-; A. Ps. C. 31 (1887) 502-.

Hazen, H. A. Science 19 (1892) 150-.

Witkowski, A. [1898] Krk. Ak. (Mt.-Prz.) Rz. 15 (1899) 247-; Cre. Ac. Sc. Bil. (1898) 282-.

Waals, J. D. van der. Amst. Ak. Vs. 8 (1900) 441-; Amst. Ak. P. 2 (1900) 379-.

CHARACTERISTIC EQUATION.

Davy, (Sir) H. R. I. J. 1 (1802) 269-.

Herapath, J. Thomson A. Ph. 8 (1816) 56-.

Meikle, H. QJ. Sc. 1 (1829) 56-.

Potter, R. Ph. Mg. 6 (1853) 161-; 23 (1862) 52-.

Dupré, A. C. R. 59 (1864) 905-.

Heath, J. M. Ph. Mg. 39 (1870) 347-.

Gladbach, P. A. Ps. C. 145 (1872) 318-.

Mendelejeff, D. I. Berl. B. 7 (1874) 1455.

Kuhn, M. Carl Rpm. 11 (1875) 327-.

Mendelejeff, D. I. C. R. 82 (1876) 412-.

Waals, J. D. van der. Amst. Ak. Vs. M. 15 (1880) 199-; A. Ps. C. Beibl. 4 (1880) 749-.

Biehringer, (Dr.) —. Z. Mth. Ps. 26 (1881) 377-.

Gouilly, A. C. R. 93 (1881) 722-, 1134-.

Amagat, E. H. C. R. 94 (1882) 847-; A. C. 28 (1888) 500-.

Thiesen, M. A. Ps. C. 24 (1885) 467-.

Natanson, L. C. R. 109 (1889) 890-.

Antoine, C. C. R. 112 (1891) 284-.

Proell, R. Dresden Isis Sb. (1891) 29-.

Weinstein, B. A. Ps. C. 54 (1895) 544-.

Waals, J. D. van der. [1896] Amst. Ak. Vs. 5 (1897) 150-; Fsch. Ps. (1896) (*Ab.* 2) 199-.

Thiesen, M. A. Ps. C. 63 (1897) 329-.

Woodward, C. M. St. Louis Ac. T. 9 (1899) 53-.

Guye, P. A., & *Friderich*, L. Arch. Sc. Ps. Nt. 9 (1900) 505-.

carbon dioxide. *Clausius*, R. [1879] A. Ps. C. 9 (1880) 337-.

— —. *Sarrau*, E. C. R. 101 (1885) 1145-.

— —. *Walckenaer*, C. A. Mines 4 (1893) 420-.

— —. *Rankine's* form. *Turazza*, D. Ven. At. (1859-60) 53-.

corresponding states. *Waals*, J. D. van der. Amst. Ak. Vh. 20 (1880) (*Nos.* 6 & 7) 32 + 11 pp.; A. Ps. C. Beibl. 5 (1881) 27-, 250-; Amst. Ak. Vh. 21 (1881) *No.* 5, 10 pp.; A. Ps. C. 5 (1881) 567-.

— —. *Natanson*, L. C. R. 109 (1889) 855-.

form of *Clausius*. *Sarrau*, E. C. R. 101 (1885) 941-.

— —. *Riecke*, E. Gött. Nr. (1894) 285-.

— derived from *Joule-Thomson* effect. *Schiller*, N. A. Ps. C. 40 (1890) 149-.

— of van der *Waals*. *Kraevič*, K. Rs. Ps.-C. S. J. 19 (*Ps.*) (1887) 1-; J. de Ps. 7 (1888) 271-.

— — — —. *Sonin*, N. J. [1889] Vars. S. Nt. Tr. (1889-90) (*C. R.*, *Ps. C.*) *No.* 5, 9-, *No.* 6, 1-; Fsch. Ps. (1890) (*Ab.* 2) 247-.

— — — —. *Korteweg*, D. J. Nt. 45 (1892) 152-, 277-.

— — — —. *Boltzmann*, L. Amst. Ak. Vs. 7 (1899) 477-; Amst. Ak. P. 1 (1899) 398-.

— — — —. (*Boltzmann*). *Waals*, J. D. van der. Amst. Ak. Vs. 7 (1899) 537-; Amst. Ak. P. 1 (1899) 468-.

- form of van der Waals, corresponding states. *Young, S.* [1892-93] *L. Ps. S. P.* 11 (1892) 233-; 12 (1894) 447-; *Ph. Mg.* 33 (1892) 153-; 37 (1894) 1-.
- , —, —, —, —. *Meslin, G.* *C. R.* 116 (1893) 135-.
- , —, —, —, modified. *Boltzmann, L., & Mache, —.* *Wien Az.* 36 (1899) 87-.
- , —, —, —, physical meaning of 'b.' *Heilborn, E.* *Exner Rpm.* 27 (1891) 369-.
- hydrogen. *Antoine, C.* *C. R.* 110 (1890) 1253-.
- isopentane. *Young, S.* *L. Ps. S. P.* 13 (1895) 602-.
- nitrogen. *Sarrau, É.* *C. R.* 110 (1890) 880-.
- , *Antoine, C.* *C. R.* 110 (1890) 1122-.
- rarefied gases. *Baly, E. C. C., & Ramsay, W. L.* *Ps. S. P.* 13 (1895) 187-; *Ph. Mg.* 38 (1894) 301-.
- various vapours. *Antoine, C.* *C. R.* 110 (1890) 632-; 114 (1892) 1177-.
- water vapour. *Antoine, C.* *C. R.* 114 (1892) 162-.
- , —. *Manaira, A.* *N. Cim.* 1 (1895) 365-.
- , —. *Tumirz, O.* *Wien Ak. Sb.* 108 (1899) (Ab. 2a) 1058-.

Coefficients of increase of elasticity and volume in gases, independence. *Sluginov, N. P.* *Kazan S. Nt. (Ps.-Mth.)* P. 5 (1887) 169-.

Cohesion in relation to Carnot's function. *Croll, J. B. A. Rp.* (1862) (pt. 2) 21.

COMPRESSIBILITY OF GASES.

- Burckhardt, J. K.* *Zach M. Cor.* 9 (1804) 308-.
- Ivory, J.* *Tilloch Ph. Mg.* 66 (1825) 3-.
- Örsted, H. C.* [1825] *Edinb. J. Sc.* 4 (1826) 224-.
- Regnault, V.* *C. R.* 23 (1846) 787-.
- Avogadro, A.* [1851] *Tor. Mm. Ac.* 13 (1853) 171-.
- Regnault, V.* *R. S. P.* 6 (1853) 298-.
- Akin, K.* [1866] (xii) *Mag. Tud. Ak. Étk. (Term.)* 1 (1870) (No. 6) 7 pp.
- Mendelyeev, D. I.* (xii) *Rs. C. S. J.* 4 (1872) 309-.
- Hemilian, W., & Mendelejeff, D.* *Berl. B.* 9 (1876) 1341-.
- Cailletet, L.* *C. R.* 88 (1879) 61-.
- Moutier, J.* *Par. S. Phlm. Bll.* 3 (1879) 184-.
- Bouty, E.* *J. de Ps.* 9 (1880) 12-.
- Roth, F.* *A. Ps. C.* 11 (1880) 1-.
- Sarrau, É.* *C. R.* 94 (1882) 639-, 718-, 845-.
- Amagat, E. H.* *A. C.* 28 (1883) 456-.
- Puschl, C.* *Wien Ak. Sb.* 96 (1888) (Ab. 2) 1028-.
- Zilov, P. A.* [1891] *Vars. S. Nt. Tr.* (1891-92) (C. R., Ps. C.) No. 6, 10-; *Fschr. Ps.* (1891) (Ab. 2) 248-.
- about atmospheric pressure. *Leduc, A.* *C. R.* 123 (1896) 743-.
- , —, —. *Leduc, A., & Sacerdote, P.* *C. R.* 125 (1897) 297-.

- about atmospheric pressure. *Leduc, A.* *C. R.* 125 (1897) 646-, 838.
- and expansion. *Amagat, E.* *C. R.* 71 (1870) 67-; 73 (1871) 183-.
- , —, new method. *Amagat, E. H.* *C. R.* 111 (1890) 871-.
- during explosions. *Vieille, —.* *Par. S. Ps. Sé.* (1891) 73-.
- at high pressure. *Cailletet, L.* *C. R.* 70 (1870) 1131-.
- , —, —. *Amagat, E. H.* *C. R.* 87 (1878) 432-; 88 (1879) 336-; 89 (1879) 437-; *A. C.* 19 (1880) 345-; *C. R.* 107 (1888) 522-.
- , —, temperatures. *Blaserna, P.* *C. R.* 69 (1869) 132-.
- , low pressure. *Mendelejeff, D. I., Hemilian, W., & Boguski, J. G.* *Berl. B.* 9 (1876) 1312.
- relation to mechanical theory of heat. *Dupré, A.* *A. C.* 1 (1864) 168-.
- and vapours. *Antoine, —.* *C. R.* 102 (1886) 863-.

Specified Gases.

- air. *Antoine, C.* *C. R.* 108 (1889) 141-.
- and carbon dioxide. *Blaserna, P.* [1865] *Palermo G. Sc. Nt.* 1 (1866) 51-.
- , —, —. *Amagat, E. H.* *A. C.* 28 (1883) 464-.
- , —, —, under low pressure, at high temperature. *Amagat, E. H.* *C. R.* 93 (1881) 306-.
- , —, —, mixtures. *Lala, U.* *C. R.* 111 (1890) 819-.
- , as gaseous mixture. *Amagat, E. H.* *C. R.* 127 (1898) 88-.
- , up to high pressures. *Antoine, C.* *C. R.* 110 (1890) 335-.
- , hydrogen and carbon dioxide at low pressure. *Amagat, E. H.* *A. C.* 28 (1883) 480-.
- and hydrogen at high temperatures. *Amagat, E. H.* *C. R.* 75 (1872) 479-; *A. C.* 28 (1873) 274-.
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- Capacity for heat and latent heat, mathematical theory. *Herapath, J.* Thomson A. Ph. 2 (1821) 50-, 89-, 201-, 256-, 363-, 434-; 3 (1822) 16-.
- Cooling of bodies on Etna, actinometric measurement. *Bartoli, A., & Stracciati, E.* [1890] *Catania Ac. Gioen. Bll.* 16 (1891) 2-; *Rv. Sc.-Ind.* 25 (1893) 81-.
- Evaporative power of fuel, estimation. *Rankine, W. J. M.* [1866-67] *Glasg. Ph. S. P.* 6 (1868) 123-; *Les Mondes* 15 (1867) 627-, 669-.
- Heat, measurement. *West, G.* C. R. 78 (1874) 426-.
- , — by evaporation. *Müller-Erzbach, W.* Brem. Ab. 11 (1890) 221-.
- , quantities in mixtures of metals. *Rudberg, F.* Pogg. A. 71 (1847) 460-.
- Human calorimetry. *Lefèvre, J.* Par. S. Bl. Mm. 50 (1898) (C. R.) 1-.
- Mechanical effects produced in bodies by heat. *Résal, H.* C. R. 51 (1860) 449-.
- Specific heat. *Luckcock, J.* Tilloch Ph. Mg. 53 (1819) 44-.
- — — — — *Avogadro, A.* [1822] *Mod. Mm. S.* It. 19 (1823) 83-.
- — — — — *Joule, J. P.* Ph. Mg. 25 (1844) 334-.
- — — — — *Woestyn, A. C. A. C.* 23 (1848) 295-.
- — — — — *Canestrini, E.* [1884] *Padova S. Sc. At.* 9 (1885) 5-.
- — — — — and affinity. *Avogadro, A.* [1823-25] *Tor. Mm. Ac.* 28 (1824) 1-; 29 (1825) 79-; *Brugnatelli G.* 8 (1825) 432-.
- Steam, condensation by currents of air. *Popper, J.* Dingler 268 (1888) 161-.
- Thermal and other physical properties of bodies, correlations. *Cantoni, G.* Rm. R. Ac. Linc. T. 4 (1880) 74-.
- Berthelot, M. J.* de Ps. 10 (1891) 169-.
- Joly, J.* Nt. 52 (1895) 4.
- Griffiths, E. H.* Nt. 52 (1895) 30.
- Pickering, S.* Nt. 52 (1895) 80.
- Joly, J.* Nt. 52 (1895) 80.
- Griffiths, E. H.* Nt. 52 (1895) 535; *Ph. Mg.* 40 (1895) 431-.

UNITS OF HEAT.

1610 Calorimetric Methods

- (Choice.) *Bartoli, A.* Mil. I. Lomb. Rd. 29 (1896) 99-.
- Warburg, E. D. Nt. Vh.* (1899) (*Th. 2, Hälfte* 1) 62-; *Ps. Z.* 1 (1900) 171-.
- Calory, determination of value. *Favre, P. A.* A. C. 1 (1874) 438-.
- , Regnault's, and specific volumes of steam. *Starkweather, G. P.* Am. J. Sc. 7 (1899) 13-.

Volume, pressure, temperature and specific heat, relations. *Main, P. T.* B. A. Rp. (1886) 100-; (1888) 465-.

1610 Calorimetric Methods.

- Absolute method. *Pettersson, O.* Nt. 30 (1884) 320-.
- Accuracy in method of mixtures, precautions for. *Wadsworth, F. L. O.* Am. J. Sc. 4 (1897) 265-.
- Aniline, employment in calorimetric measurements. *Bartoli, A.* Mil. I. Lomb. Rd. 28 (1895) 1032-.
- Bomb, calorimetric, use. *Berthelot, —.* C. R. 115 (1892) 201-.
- , —, — to find calorific value of coal. *Scheurer-Kestner, —.* C. R. 112 (1891) 233-.
- Calculated calorific intensity and evaporative power of coal, determination, and New Zealand coals. *Hector, (Sir) J. N. Z.* Col. Ms. Gl. Sv. Rp. 20 (1890) xxx-.

CALORIMETERS.

- air- (variation of Favre and Silbermann's). *Gezekhus [Hesekhus], N. A.* (xii) Rs. Ps.-C. S. J. 15 (*Ps., Pt. 1*) (1883) 10-; *Fschr. Ps.* (1885) (*Ab. 2*) 466.
- , *Lefèvre, J.* Par. S. Bl. Mm. 50 (1898) (C. R.) 415-.
- (Lefèvre). *Arsonval, — d'.* Par. S. Bl. Mm. 50 (1898) (C. R.) 444-.
- , differential. *Preobrazhenskii, V. V.* (xii) Rs. Ps.-C. S. J. 15 (*Ps., Pt. 1*) (1883) 67-; *J. de Ps.* 3 (1884) 455.
- combustion. *Favre, P. A.* C. R. 66 (1868) 788-.
- description and use. *Montgolfier, J. M. J.* Mines 19 (1806) 67-.
- Dulong's. *Cabart, —.* C. R. 7 (1838) 872-.
- electric. *Röiti, A.* Tor. Ac. Sc. Mm. 37 (1886) 367-.
- , compared with Riess thermometer. *Röiti, A.* Ven. I. At. (1884-85) 2107-.
- evaporation- and condensation-. *Neesen, F.* Berl. Ps. Gs. Vh. (1887) 87-; (1888) 73-.
- glacial acetic acid. *Harker, J. A., & Hartog, P. J.* B. A. Rp. (1892) 662.
- ice-. *Volpicelli, P. G.* Arcad. 60 (1833) 50-.
- , *Brown, A. C.* [1870] Edinb. R. S. P. 7 (1872) 321-.
- , *Bunsen, R. W.* A. Ps. C. 141 (1870) 1-.
- , *Bohn, C. A.* Ps. C. 142 (1871) 618-.

Calorimeters 1610

- ice-, *Bunsen's. Wartha, V.* (xii) Mag. Tud. Ak. Éts. 9 (No. 5) (1875) 52-.
- , —, *Reichert, E.* Carl Rpm. 12 (1876) 77-.
- , —, *Stewart, B.* Manch. Lt. Ph. S. P. 18 (1879) 66-.
- , —, *Blümcke, A.* A. Ps. C. 26 (1885) 159-.
- , —, addition to. *Boys, C. V.* Ph. Mg. 24 (1887) 214-.
- , —, modified. *Gee, W. W., & Stroud, W. L.* Ps. S. P. 4 (1881) 52-; *Ph. Mg.* 10 (1880) 171-.
- , —, —, *Stewart, B., & Stroud, W.* L. Ps. S. P. 4 (1881) 342-; *Ph. Mg.* 12 (1881) 172-.
- , —, —, *Barrett, W. F.* [1885] *Dubl. S. Sc. P.* 5 (1886-87) 13-.
- , historical note. *Andrews, (Prof.) T. A.* Ps. C. 142 (1871) 320-.
- , —, — (Andrews). *Bunsen, R. W.* A. Ps. C. 142 (1871) 616-.
- , return of mercury-thread. *Neesen, F.* [1883] (xii) Berl. Ps. Gs. Vh. 2 (1884) 29-.
- for lecture purposes. *Baker, T. J.* B. A. Rp. (1886) 525-.
- Lewis Thompson's. *Scheurer-Kestner, —.* Mulhouse S. In. Bll. 58 (1888) 506-.
- , —, *H. Oestr. Z. Brgv.* 37 (1889) 212.
- mercury-. *Favre, P. A.* J. de Ps. 1 (1872) 332-; *Par. Bll. S. C.* 18 (1872) 50-, 385-; 19 (1873) 441-.
- (Favre). *Berthelot, M.* Par. Bll. S. C. 18 (1872) 57-, 388-.
- , *Favre, P. A.* A. C. 1 (1874) 438-.
- for method of cooling. *Violle, J. C.* R. 94 (1882) 1510-.
- microcalorimeter. *Cybulski, N.* Cro. Ac. Sc. Bll. (1890) 294-; (1894) 92-.
- mixing-. *Pickering, S. U.* Ph. Mg. 29 (1890) 247-.
- mixtures, method. *Waterman, F. A.* Ph. Mg. 40 (1895) 413-.
- new. *Hannay, J. B.* [1878] *Manch. Lt. Ph. S. Mm.* 6 (1879) 242-.
- , *Barrett, W. F.* B. A. Rp. (1885) 938.
- , *Peabody, C. H.* Franklin I. J. 126 (1888) 134-.
- , *Gerstmann, H.* D. Ps. Gs. Vh. (1899) 194-.
- registering (applicable to man). *Arsonval, A. d'.* C. R. 100 (1885) 1400-; *Par. S. Bl. Mm.* 37 (1885) (C. R.) 50-, 55-.
- , automatic (applicable to living beings). *Arsonval, A. d'.* C. R. 102 (1886) 799-.
- respiration-. *Atwater, W. O., & Rosa, E. B.* Am. As. P. (1897) 127-; *Ps. Rv.* 9 (1899) 129-, 214-.
- for specific heats of liquids and solids. *Rumford, B. (Count).* [1813] A. C. 1 (*1884) 284-.
- steam-. *Bunsen, R. A.* Ps. C. 31 (1887) 1-.
- , *Joly, J.* R. S. P. 47 (1890) 218-.
- , *Neesen, F.* A. Ps. C. 39 (1890) 131-.
- , *Goodman, J.* [1900] *Sc. Abs.* 4 (1901) 81-.
- , and specific heats by comparative method. *Schükarew, A.* A. Ps. C. 59 (1896) 229-.

1610 Calorimetry

steam, "throttling." *Fullan, M. T.* [1897] Sc. Abs. 1 (1898) 202-
for testing fuel on small scale. *Donkin, B. (jun.)*, & *Holliday, J.* I. CE. P. 102 (1890) 292-.

Calorimetric corrections. *Boulouch, R.* Bordeaux S. Sc. PV. (1897-98) 132-.

— measurements. *Bartoli, A.*, & *Stracciati, E.* Rm. R. Ac. Linc. Rd. 1 (1885) 541-573-.

— of solar radiation. *Bartoli, A.* N. Cim. 35 (1894) 239-.

—, temperature corrections. *Pfaundler, L.* A. Ps. C. 11 (1880) 237-.

— method (reclamation of priority for Jamin). *Akin, (Dr.) C. K.* C. R. 70 (1870) 1403-.

— researches. *Bunsen, R. W.* Ph. Mg. 41 (1871) 392-.

— thermometers. *Berthelot, M.* J. de Ps. 2 (1873) 18-.

Calorimetry at constant temperature. *Arsonval, A. d'.* C. R. 106 (1888) 1225-.

—, experimental error. *Pickering, S. U.* L. Ps. S. P. 8 (1887) 1-; Ph. Mg. 21 (1886) 324-.

— of iron at high temperatures. *Pionchon, —.* C. R. 102 (1886) 1454-; A. C. 11 (1887) 33-.

— metals at high temperatures. *Pionchon, —.* C. R. 102 (1886) 675-; 103 (1886) 1122-; A. C. 11 (1887) 33-.

Condensation method. *Joly, J.* R. S. P. 41 (1887) 352-.

Cooling method. *Regnault, V.* A. C. 9 (1843) 322-.

—, *Bartoli, A.* Mil. I. Lomb. Rd. 28 (1895) 787-.

Correction for cooling. *Berthelot, M.* J. de Ps. 2 (1873) 345-; 10 (1881) 79-.

—, *Bartoli, A.*, & *Stracciati, E.* Catania Ac. Gioen. Bil. 26-28 (1892) 4-.

— radiation. *Holman, S. W.* Am. Ac. P. 31 (1896) 245-.

Differential method. *Joly, J.* Nt. 30 (1884) 361.

Electric current, use. *Jamin, J.* C. R. 70 (1870) 657-.

Electrocalorimetry. *Stroud, W.*, & *Gee, W. W. H.* Elect. 21 (1888) 705-.

—, *Evershed, S.*, & others. Elect. 21 (1888) 773 et seq.; 22 (1889) 24.

Heat of combustion. *Stohmann, F.*, & *Rechenberg, C. von.* Lndw. Jb. 13 (1884) 513-.

—, quantity, sensitive and convenient method of measuring. *Lussana, S.* Rv. Sc. [Ind.] 30 (1898) 176-.

Saturated liquids, complete study. *Mathias, E.* Toul. Fac. Sc. A. 10 (1896) E, 52 pp.

Specific heat. *Canestrini, E.* [1884] Padova S. Sc. At. 9 (1885) 5-.

Thermochemical work at high temperature, apparatus. *Joannis, —.* Bordeaux S. Sc. Mm. 4 (1888) xxiv-.

Thermoscope, double, for thermal experiments. *Looser, —.* Frkf. a. M. Ps. Vr. Jbr. (1893-94) 42-.

Water, anomalies. *Guillaume, C. É.* Par. S. Ps. Sé. (1898) 66-.

Specific Heats 1620

Water equivalent of thermometers used in specific heat determinations. *Sozzani, A.* N. Cim. 5 (1897) 135-.

1620 Specific Heats of Solids and Liquids.

(See also Chemistry 7220.)

Avogadro, A. A. C. 55 (1833) 80-; 57 (1834) 113-.

Delarive, A. C. R. 10 (1840) 823-.

Cerruti, V. Rm. R. Ac. Linc. T. 1 (1877) 136-.

Moriset, —. C. R. 90 (1880) 814-.

Bohn, C. Z. Mth. Ps. 28 (1883) 83-.

Demonstration of inequalities. *Lachinov, D. A.* (xii) Rs. Ps.-C. S. J. 12 (Ps.) (1890) [(Pt. 1)] 131-.

Function h. *Nikolaev, V. V.* (xii) Rs. Ps.-C. S. J. 14 (Ps.) (1882) [(Pt. 1)] 61-.

MEASUREMENT.

Joule, J. P. [1845] Manch. Ph. S. Mm. 7 (1846) 559-.

Thoulet, M. J. O., & *Lagarde, H.* (xii) Fr. S. Mn. Bil. 5 (1882) 179-.

Moriset, —. C. R. 97 (1883) 1426-.

Louguine, W. Z. Instk. 16 (1896) 129-, 192.

cooling method. *Neesen, —.* D. Nf. Tbl. (*1880) 135-.

electric method. *Joule, J. P.* [1847] Manch. Ph. S. Mm. 8 (1848) 375-.

—, *Huntly, G. N.* Nt. 36 (1887) 438-.

—, *Stroud, W.* Nt. 36 (1887) 483.

—, *Pfaundler, L.* Wien Ak. Sb. 100 (1891) (Ab. 2a) 352-.

—, *Schlamp, A.* Giessen Oberh. Gs. B. 31 (1896) 100-.

experimental fact. *Vargiu, G. I.* Les Mondes 10 (1866) 267-.

at high temperatures. *Ehrhardt, O.* A. Ps. C. 24 (1885) 215-.

—, *Sutherland, W.* Ph. Mg. 26 (1888) 298-.

Kopp's method. *Wüllner, A.* Bonn SB. Niedr. Gs. (1867) 28-.

by method of known chemical action. *Brusotti, F.* Rm. At. R. Ac. 25 (1872) 350-.

— mixture. *Bohn, C.* A. Ps. C. 122 (1864) 289-.

—, *Poynting, J. H.* [1883] Birm. Ph. S. P. 4 (1885) 47-.

—, *Gezechus [Heschus], N.* Rs. Ps.-C. S. J. 19 (Ps.) (1887) 432-; J. de Ps. 7 (1888) 489-.

Specific heat and characteristic function for any body. *Phillips, É.* C. R. 86 (1878) 1290-, 1351-.

— — — — — (Phillips). *Lévy, M.* C. R. 86 (1878) 1391-.

— near critical point, influence of pressure. *Heen, P. de.* Brux. Ac. Bil. 27 (1894) 232-.

— and density in same series. *Moutier, J.* Par. S. Phlm. Bil. 7 (1883) 80-.

- Specific heat and elasticity. *Cantoni, G. Mil. I. Lomb. Rd. 2 (1869) 201-, 231-, 334-.*
 — — — and other physical constants. *Tomlinson, H. R. S. P. 38 (1885) 488-.*
 — — — energy of body. *Clausius, R. C. R. 87 (1878) 718-.*
 — — — expansion. *Tredgold, T. Tilloch Ph. Mg. 52 (1818) 251-.*
 — — —. *Phillips, E. C. R. 71 (1870) 338-.*
 — — — latent heat, and heat of spontaneous expansion. *Fusini, A. Brugnatelli G. 6 (1823) 131-.*
 — — — molecular pressure. *Barus, C. Am. Ac. P. 26 (1891) 313-.*
 — — — state of aggregation, kinetic theory. *Walter, A. [1881] A. Ps. C. 16 (1882) 500-.*
 — — — volume, laws. *Phillips, S. E. Nt. 30 (1884) 288-.*

SPECIFIC HEATS OF LIQUIDS.

- Groshans, J. A. Arch. Néerl. 5 (1870) 1-, 193-.*
Baumgartner, G. Carl Rpm. 17 (1881) 586-.
Nadezhdin, A. I. Kiev S. Nt. Mm. 7 (1884) xcix-; Rs. Ps.-C. S. J. 16 (Ps.) (1884) 222-; Exner Rpm. 20 (1884) 446-.
 belonging to homologous series. *Schiff, R. Gz. C. It. 16 (1886) 454-.*
 calculation. *Pagliani, S. Tor. Ac. Sc. At. 20 (1885) 54-.*
 —. *Langlois, M. C. R. 104 (1887) 420-.*
 and cohesion and density. *Bartoli, A. N. Cim. 6 (1879) 141-.*
 — internal forces. *Puschl, C. Wien Ak. Sb. 98 (1890) (Ab. 2a) 173-.*
 — — — in water. *Puschl, C. Wien Ak. Sb. 97 (1889) (Ab. 2a) 1118-.*
 measurement. *Wartmann, E. Arch. Sc. Ps. Nt. 38 (1870) 62-.*
 —. *Grimaldi, G. P. Rm. R. Ac. Linc. Rd. 7 (1891) (Sem. 2) 58-.*
 —. *Bartoli, A., & Stracciati, E. Catania Ac. Gioen. Bil. 23-24 (1892) 10-.*
 —. *Litch, R. L. Ps. Rv. 5 (1897) 182-.*
 —. *Rosenhain, W. Vict. R. S. P. 10 (1898) 97-.*
 —. *Negreano, D. C. R. 128 (1899) 875-.*
 —. Andrew's method, errors. *Gumlich, E., & Wiebe, H. F. A. Ps. C. 66 (1898) 530-.*
 —. — improved. *Pfaundler, L. A. Ps. C. 67 (1899) 439-.*
 — near critical temperature. *Heen, P. de. Brux. Ac. Bil. 15 (1888) 522-.*
 solutions. *Mathias, E. C. R. 107 (1888) 524-; J. de Ps. 8 (1889) 204-, 619-.*
 —. *Tammann, G. Z. Ps. C. 18 (1895) 625-.*
 —. *Konovalov, D. Rs. Ps.-C. S. J. 30 (C.) (1898) 353-; Par. S. C. Bil. 22 (1899) 3-.*
 — (Konovalov). *Biron, E. Rs. Ps.-C. S. J. 30 (C.) (1898) 355-; Par. S. C. Bil. 22 (1899) 3-.*
 — not electrolytes. *Magie, W. F. Ps. Rv. 9 (1899) 65-.*
 —, and thermal effect in their formation. *Aleksyev, V. T. [1883] (x) Rs. Ps.-C. S. J. 16 (Pt. 1) (1884) 109-; Berl. B. 17 (1884) (Ref.) 193-.*
 —, variation with strength. *Mathias, E. Par. S. Ps. Sé. (1888) 354-.*

variation with temperature. *Heen, P. de, & Deruyts, F. Brux. Ac. Bil. 15 (1888) 168-.*

SPECIFIED LIQUIDS.

- ammonia, anhydrous. *Elleau, L. A., & Ennis, W. D. Franklin I. J. 145 (1898) 189-, 280-.*
 —, liquefied. *Strombeck, E. von. Franklin I. J. 130 (1890) 467-.*
 —. —. *Ludeking, C., & Starr, J. E. Am. J. Sc. 45 (1893) 200-.*
 aniline, variation with temperature. *Griffiths, E. H. [1894] L. Ps. S. P. 13 (1895) 234-; Ph. Mg. 39 (1895) 47-, 143-.*
 —. —. *Bartoli, A. Mil. I. Lomb. Rd. 28 (1895) 1032-.*
 —, "volume heat." *Griffiths, E. H. Camb. Ph. S. P. 8 (1895) 303-.*
 benzene. *Demerliac, —. As. Fr. C. R. (1894) (Pt. 2) 325-.*
 blood. *Hillerson, S., & Stein-Bernstein, D. [1898] Pliste. Rs. 1 (1898-99) 43-.*
 —. *Bordier, H. C. R. 130 (1900) 799-; J. Pl. Pth. Gén. 2 (1900) 381-.*
 brines of different specific gravity. *Strombeck, H. von. Franklin I. J. 134 (1892) 154-.*
 carbon compounds. *Schiff, R. Z. Ps. C. 1 (1887) 376-.*
 hydrocarbons (C_nH_{2n+2}). *Bartoli, A., & Stracciati, E. Mil. I. Lomb. Rd. 29 (1896) 157-.*
 —. *Pagliani, S. N. Cim. 4 (1896) 146-.*
 — and alcohols. *Pagliani, S. Rm. R. Ac. Linc. Rd. 5 (1889) (Sem. 1) 885-.*
 lava. *Bartoli, A. Catania Ac. Gioen. At. 3 (1891) 61-; Mil. I. Lomb. Rd. 29 (1896) 363-.*
 mercury. *Hedelius, E., & Pettersson, O. Stockh. Öfv. 35 (1878) No. 2, 35-; A. Ps. C. Beibl. 2 (1878) 398-.*
 —. *Langlois, M. C. R. 103 (1886) 1009-.*
 — (0° to 30°). *Bartoli, A., & Stracciati, E. Mil. I. Lomb. Rd. 28 (1895) 469-.*
 —, variation with temperature. *Winkelmann, A. A. Ps. C. 159 (1876) 152-.*
 —. —. —. *Pettersson, O. Stockh. Öfv. 35 (1878) No. 9, 3-; A. Ps. C. Beibl. 3 (1879) 739-.*
 —. —. —. *Naccari, A. Tor. Ac. Sc. At. 23 (1887-88) 594-.*
 —. —. —. *Milthaler, J. A. Ps. C. 36 (1889) 897-.*
 —. —. —. *Heilborn, E. Z. Ps. C. 7 (1891) 85-.*
 —. —. —. *Bartoli, A., & Stracciati, E. Catania Ac. Gioen. Bil. 26-28 (1892) 11.*
 milk. *Fleischmann, W. Münch. Ak. Sb. 4 (1874) 97-.*
 oil of turpentine, isomers. *Regnault, V. A. C. 9 (1843) 322-.*
 organic liquids. *Schiff, R. Gz. C. It. 17 (1887) 286-.*
 potassium and calcium chlorides, solutions. *Drecker, J. A. Ps. C. 34 (1888) 952-.*
 saline solutions. *Person, C. C. R. 31 (1850) 566-; A. C. 33 (1851) 437-, 448-.*

- saline solutions. *Gray, T.* Edinb. R. S. P. 10 (1880) 689-.
- soda solutions, strong. *Blümcke, A.* A. Ps. C. 25 (1885) 417-.
- sulphur dioxide, liquid. *Mathias, E.* C. R. 119 (1894) 404-.
- sulphuric acid solutions. *Cattaneo, C.* N. Cim. 26 (1889) 50-.
- water (near 4°C.). *Hirn, G. A.* C. R. 70 (1870) 592-.
- (0° to 100°C.). *Jamin, J., & Amaury, —.* C. R. 70 (1870) 661-.
- (near 4°C.). *Hirn, G. A.* C. R. 70 (1870) 831-.
- *Willner, F. H. A.* A. Ps. C. 1 (1877) 592-; 10 (1880) 284-.
- *Henrichsen, S.* A. Ps. C. 8 (1879) 83-.
- *Neesen, F.* A. Ps. C. 18 (1883) 369-.
- *Velten, A. W.* A. Ps. C. 21 (1884) 31-.
- *Sutherland, W.* Ph. Mg. 26 (1888) 298-.
- *Bartoli, A., & Stracciati, E.* Catania Ac. Gioen. Bil. 7 (1889) 3-.
- *Ekholm, N.* Stockh. Ak. Hndl. Bh. 15 (Afd. 1) (1890) No. 6, 35 pp.
- (below 0°C.). *Martinetti, M.* Tor. Ac. Sc. At. 25 (1890) 827-.
- *Bartoli, A., & Stracciati, E.* Catania Ac. Gioen. Bil. 18-19 (1891) 25-.
- (0° to 40°C.). *Johanson, A. M.* Stockh. Öfv. (1891) 325-; Föchr. Ps. (1891) (Ab. 2) 365-.
- (0° to 32°). *Bartoli, A., & Stracciati, E.* Catania Ac. Gioen. At. 4 (1892) Mem. 7, 96 pp.
- (— — —) (Bartoli and Stracciati). *Lungo, C. del.* Catania Ac. Gioen. At. 6 (1893) Mem. 1, 3 pp.
- (0° to 31°). *Bartoli, A., & Stracciati, E.* Mil. I. Lomb. Rd. 26 (1893) 517-.
- *Pettinelli, P.* [1898] J. de Ps. 8 (1899) 490-.
- (0° to 100°C.). *Callendar, H. L., & Barnes, H. T.* Ps. Rv. 10 (1900) 202-.
- and alcohol mixtures. *Jamin, J., & Amaury, —.* C. R. 70 (1870) 1237-.
- — —, variation with temperature. *Blümcke, A.* A. Ps. C. 25 (1885) 154-.
- at constant volume. *Bartoli, A., & Stracciati, E.* Mil. I. Lomb. Rd. 27 (1894) 524-.
- near maximum density. *Pfaundler, L., & Platter, H.* D. Nf. Festschr. (*1869) 67-; Wien Sb. 62 (1870) (Ab. 2) 379-.
- — — *Gerosa, G. G.* Rm. R. Ac. Linc. Mm. 10 (1881) 75-.
- and methyl alcohol mixtures. *Lecher, E.* [1877] Wien Sb. 76 (1878) (Ab. 2) 937-.
- , salt and fresh. *La Chabeaussière, —.* Mntp. Rec. Bil. 2 (1805) 286-.
- , sea. *Thoulet, —, & Chevallier, —.* C. R. 108 (1889) 794-.
- , and lake. *Somigliana, C.* Mil. I. Lomb. Rd. 30 (1897) 154-.
- , supercooled. *Cardani, P., & Tomasini, F.* N. Cim. 21 (1887) 185-.
- , — *Bartoli, A., & Stracciati, E.* N. Cim. 31 (1892) 133-.

- water, in terms of international electric units. *Schuster, A., & Gannon, W.* [1894] Phil. Trans. (A) 186 (1896) 415-.
- , uncertainty. *Weber, W. E.* Pogg. A. 18 (1830) 608-.
- , variation. *Callendar, H. L., & Barnes, H. T.* B. A. Rp. (1899) 624-.
- , — with temperature. *Rankine, W. J. M.* [1851] Edinb. R. S. T. 20 (1853) 441-.
- — — *Bosscha, J.* (vii) Pogg. A. (Jubelbd.) (1874) 549-.
- — — *Rowland, H. A.* [1879] Am. Ac. P. 15 (1880) 75-.
- — — *Dieterici, C.* A. Ps. C. 57 (1896) 333-.
- — — *Pernet, J.* Zür. Vjschr. 41 (1896) (Festschr., Th. 2) 121-.

SPECIFIC HEATS OF SOLIDS.

- Kurz, A.* [1875] A. Ps. C. Ergänz. 7 (1876) 334-.
- kinetic theory. *Eddy, H. T.* Science 2 (*1893) 424-, 850.
- measurement. *Johnson, W. R.* Franklin I. J. 14 (1834) 306-.
- *Amsler, J.* [1850] Zür. Mt. 2 (1850-52) 241-.
- at high temperatures. *Pionchon, —.* A. C. 11 (1887) 33-.
- , Regnault's method, criticism. *Pape, C.* A. Ps. C. 123 (1864) 277-.
- in small quantities. *Thoulet, J., & Lagarde, H.* C. R. 94 (1882) 1512-.
- variation with temperature. *Zakrzewski, I.* Krk. Ak. (Mt.-Prz.) Rz. 3 (1891) 327-; Crc. Ac. Sc. Bil. (1891) 146-.

SPECIFIED SOLIDS.

- alloys. *Aubel, E. van.* J. de Ps. 9 (1900) 493-.
- , anomalous. *Person, C. C.* C. R. 25 (1847) 444-.
- , fusible. *Schütz, L.* A. Ps. C. 46 (1892) 177-.
- , iron-antimony. *Laborde, J.* C. R. 123 (1896) 227-.
- aluminium. *Pionchon, J.* C. R. 115 (1892) 162-, 270.
- antimony and compounds. *Pebal, L., & Jahn, H.* A. Ps. C. 27 (1886) 584-; 28 (1886) 696.
- basalt. *Roberts-Austen, W. C., & Rücker, A.* W. B. A. Rp. (1891) 610-.
- binary mixtures. *Battelli, A., & Martinetti, M.* Rm. R. Ac. Linc. Rd. 1 (1885) 621-.
- boracite, variation with temperature. *Kroeker, K.* Gött. Nr. (1892) 122-.
- building materials. *Hutchinson, J.* [1842] (vi Adds.) C. S. P. (1843) 24-.
- caoutchouc. *Gee, W. W. H., & Terry, H. L.* B. A. Rp. (1889) 516-; Manch. Lt. Ph. S. Mm. & P. 4 (1891) 38-.
- carbon. *Le Chatelier, H.* C. R. 116 (1893) 1051-.
- *Violle, J.* C. R. 120 (1895) 868-.

- carbon, boron and silicon. *Weber, H. F.* A. Ps. C. 154 (1875) 367-, 553-.
- in different forms. *Delarive, A., & Marcet, F.* A. C. 2 (1841) 121-.
- diamonds. *Carbonelli, C. E.* Genova S. Lig. At. 2 (1891) 354-.
- ebonite, cork and palm wood. *Zinger, A., & Šteglajev, I.* Rs. Ps.-C. S. J. 27 (Ps.) (1895) 30-; J. de Ps. 5 (1896) 467-.
- glasses. *Winkelmann, A.* A. Ps. C. 49 (1893) 401-.
- *Zubov, P.* Rs. Ps.-C. S. J. 28 (Ps.) (1896) 22-; J. de Ps. 6 (1897) 603.
- ice. *Desains, É.* C. R. 20 (1845) 1345-; A. C. 14 (1845) 306-.
- *Person, C. C.* C. R. 20 (1845) 1457-.
- *Hess, H.* [1848] St. Pét. Ac. Sc. Bll. 9 (1851) 81-.
- *Langlois, M.* C. R. 102 (1886) 1451-.
- iron (magnetised). *Wassmuth, A.* Wien Ak. Sb. 85 (1882) (Ab. 2) 997-.
- at high temperatures. *Hartley, W. N. I.* & S. I. J. (1897) (No. 1) 304-.
- manganese steel. *Mitchell, A. C.* Edinb. R. S. T. 35 (1890) 947-.
- marble. *Peirce, B. O., & Willson, R. W.* Nt. 61 (1899-1900) 367.
- mellite. *Bartoli, A., & Stracciati, E.* N. Cim. 15 (1884) 5-.
- metals. *Potter, R.* Edinb. J. Sc. 5 (1831) 75-.
- (Potter). *Johnston, J. F. W.* Edinb. J. Sc. 5 (1831) 265-.
- (Johnston). *Potter, R.* [1831] Edinb. J. Sc. 6 (1832) 163-.
- *Potter, R.* Edinb. J. Sc. 6 (1832) 166-.
- *Violle, J.* C. R. 85 (1877) 543-; 87 (1878) 981-; 89 (1879) 702-; J. de Ps. 7 (1878) 69-; 9 (1880) 81-.
- (15° to 320°). *Naccari, A.* [1887] Tor. Ac. Sc. At. 23 (1887-88) 107-.
- *Le Verrier, —.* C. R. 114 (1892) 907-.
- *Waterman, F. A.* Ps. Rv. 4 (1897) 161-.
- *Jaeger, W., & Diesselhorst, H.* Berl. Ak. Sb. (1899) 719-; Berl. Ps. Reichsanst. Ab. 3 (1900) 269-.
- graphite and alloys, at low temperatures. *Behn, U.* A. Ps. 1 (1900) 257-.
- of high fusing point. *Mache, H.* Wien Ak. Sb. 106 (1897) (Ab. 2a) 590-.
- at high temperatures. *Pionchon, —.* C. R. 103 (1886) 1122-.
- low temperatures. *Behn, U.* A. Ps. C. 66 (1898) 237-.
- *Trowbridge, C. C.* Science 8 (1898) 6-.
- quasi isotropic. *Voigt, W.* Gött. Nr. (1893) 211-.
- and other solids. *Weber, W. E.* Pogg. A. 20 (1830) 178-.
- specific heat and internal work. *Joubin, P.* J. de Ps. 9 (1890) 554-.
- — — magnetism, relations. *Hermann, R.* Mosc. S. Nt. Bll. 7 (1834) 315-.
- minerals. *Joly, J.* R. S. P. 41 (1887) 250-.
- *Sella, A.* Gött. Nr. (1891) 311-.

- organic solids. *Heen, P. de.* Brux. Ac. Bll. 5 (1883) 757-.
- platinum. *Violle, J. L. G.* [1877] (xn) Isère S. Bll. 8 (1879) 20-, 107-.
- *Hoadley, J. C.* Franklin I. J. 84 (1882) 91-.
- , silver, tin, lead and copper. *Bartoli, A., & Stracciati, E.* Mil. I. Lomb. Rd. 28 (1895) 524-.
- quartz, variation with temperature. *Pionchon, —.* C. R. 106 (1888) 1344-.
- rocks of the Campagna. *Morano, F.* Rm. R. Ac. Linc. Rd. 7 (1898) (Sem. 2) 61-, 357.
- , igneous. *Barus, C.* Ph. Mg. 35 (1893) 296-.
- and minerals, Sicilian. *Bartoli, A.* N. Cim. 30 (1891) 231-.
- salts soluble in water. *Rudberg, F.* Pogg. A. 35 (1835) 474-.
- slags. *Howe, H. M.* Am. I. Mn. E. T. 18 (1890) 724-.
- soil constituents, experimental determination. *Ulrich, R.* Forsch. Ag.-Ps. 17 (1894) 1-.
- uranium. *Blümcke, A.* A. Ps. C. 24 (1885) 263-.
- vulcanite. *Mayer, A. M.* Am. J. Sc. 41 (1891) 54-.
- Thermal capacity. *Donnini, P.* N. Cim. 15 (1876) 214-.
- True thermal capacity. *Göransson, B.* Lund Acta Un. 7 (1870) (Mth.) No. 4, 22 pp.
- — — and disgregation of a body. *Clausius, R.* Arch. Sc. Ps. Nt. 24 (1865) 117-.
- — — — — (Clausius). *San Roberto, P. di.* Arch. Sc. Ps. Nt. 25 (1866) 34-.
- — — — — *Budde, E.* A. Ps. C. 141 (1870) 426-.
- — — heat-content. *Robin, G.* [1879] Par. S. Phlm. Bll. 4 (1880) 8-.
- Variation with temperature. *Wassmuth, A.* Mh. Mth. Ps. 1 (1890) 473-.
- — *Sohncke, L.* Münch. Ak. Sb. 27 (1898) 337-.
- Volatile bodies, relation between latent heat, specific heat and specific volume. *Trouton, F. T.* Nt. 27 (1883) 292.
- Water, total heat, recalculated from experiments of Regnault and Rowland. *Shaw, W. N.* B. A. Rp. (1896) 162-.

1640 Specific Heats of Gases and Vapours.

(See also Chemistry 7220.)

- Heat of permanent gases. *Plana, G.* [1842] Tor. Mm. Ac. 5 (1843) 283-.
- Hydrostat, use. *Hirn, G. A.* A. Gén. Civ. 2 (1863) (pte. 2) 113-, 153-.
- Kinetic theory of polyatomic gases. *Richarz, F.* Berl. Ps. Gs. Vh. (1891) 73-; A. Ps. C. 48 (1893) 467-.
- Mixture of liquid and vapour, specific heat at constant volume. *Olearski, K.* [1892] Krk. Ak. (Mt.-Prz.) Rz. 6 (1893) 112-; Cro. Ac. Sc. Bll. (1892) 297-.

RATIO OF SPECIFIC HEATS.

- Greguss, G. (xii) Mag. Ak. Éts. (*Mth. Term.*) 6 (1865) 63-.
- Müller, J. J. A. Ps. C. 154 (1875) 113-.
- Moutier, J. Par. S. Phlm. Bll. 2 (1878) 81-.
- Müller, P. A. [1882] A. Ps. C. 18 (1883) 94-.
- Burton, C. V. Ph. Mg. 24 (1887) 166-.
- Bogaevskij, L. G. Rs. Ps.-C. S. J. 29 (*Ps.*) (1897) 97-; Fsch. Ps. (1897) (*Ab.* 2) 332.
- Boltzmann, L. C. R. 127 (1898) 1009-.
- air. Meikle, H. Edinb. N. Ph. J. 2 (1827) 328-.
- , Rose-Innes, J. Ph. Mg. 48 (1899) 286-.
- , and Poisson's law. Kurz, A. Carl Rpm. 16 (1880) 719-.
- argon. Carbonelli, C. E. Genova S. Lig. At. 7 (1896) 32-.
- calculation. Moon, W. Ph. Mg. 18 (1884) 372-.
- (Moon). Lodge, O. J. Ph. Mg. 18 (1884) 472.
- , Sluginov, N. P. Kazan S. Nt. (*Ps.-Mth.*) P. 5 (1887) 170-.
- , Clément and Désormes's experiment. Bauer, K. L. Carl Rpm. 16 (1880) 43-.
- , —, —, history. Maneuvrier, G. Par. S. Ps. Sé. (1895) 233-.
- , —, —, method. Swyngedaew, R. J. de Ps. 6 (1897) 129-.
- carbon dioxide. Amagat, E. H. C. R. 121 (1895) 863-, 968.
- compound gases. Capstick, J. W. [1895] Phil. Trans. (A) 186 (1896) 567-.

Measurement.

- Jamin, J., & Richard, —. C. R. 71 (1870) 336-.
- Amagat, E. H. C. R. 77 (1873) 1325-.
- Moutier, J. Par. S. Phlm. Bll. 4 (1880) 170-.
- Paquet, E. J. de Ps. 4 (1885) 30-.
- Amagat, —. J. de Ps. 4 (1885) 174-.
- Lummer, O., & Pringsheim, E. Berl. Ps. Gs. Vh. (1887) 136-; B. A. Rp. (1894) 565-.
- Pringsheim, E. D. Nf. Vh. (1894) (*Th.* 2, *Hälfte* 1) 85-.
- Sack, P. Offenb. Vr. Nt. B. 33-36 (1895) 71-.
- Maneuver, G. Par. S. Ps. Sé. (1896) 243-.
- Maneuver, G., & Fournier, J. C. R. 123 (1896) 228-.
- Leduc, A. C. R. 125 (1897) 1089-, 1138.
- acetylene. Maneuvrier, G., & Fournier, J. C. R. 124 (1897) 183-.
- air. Weisbach, J. Civing. 5 (1859) 46-.
- , Maneuvrier, G. C. R. 120 (1895) 1398-; A. C. 6 (1895) 321-; Par. S. Ps. Sé. (1895) 250-.
- , oxygen, carbon-dioxide and hydrogen. Lummer, O., & Pringsheim, E. [1898] A. Ps. C. 64 (1898) 555-; Smiths. Ct. 29 (1903) *Art.* vi, 29 pp.
- by expansion hygrometer. Cozza, R. Arch. Sc. Ps. Nt. 10 (1900) 132-.
- Kohlrausch's experiment. Boltzmann, L. A. Ps. C. 141 (1870) 473-.

- monatomic gases. Yvon-Villarcéau, A. J. F. C. R. 82 (1876) 1127-, 1175-.
- superheated steam. Cohen, R. A. Ps. C. 37 (1889) 628-.
- and phosphorus. Lucchi, G. de. Ven. I. At. 7 (1880-81) 1305-.
- by velocity of sound. Kayser, H. A. Ps. C. 2 (1877) 218-.

- relation to physical properties. Violi, A. Rm. R. Ac. Linc. T. 7 (1883) 112-.
- variation with temperature. Leduc, A. C. R. 127 (1898) 659-.
- and pressure. Amagat, E. H. C. R. 122 (1896) 66-; Par. S. Ps. Sé. (1896) 24-.

- Small oscillations of gases, influence of temperature. Gromeka, J. Fsch. Mth. (1888) 1098.

SPECIFIC HEATS OF GASES.

- Haycraft, W. T. [1823] Edinb. R. S. T. 10 (1826) 195-.
- Delarive, A., & Marcet, F. A. C. 35 (1827) 5-.
- Dulong, P. L. [1828] Par. Mm. Ac. Sc. 10 (1831) 147-.
- Delarive, A., & Marcet, F. A. C. 41 (1829) 78-.
- Apjohn, Jas. B. A. Rp. (1835) (*pt.* 2) 30-.
- Delarive, A., & Marcet, F. [1835] A. C. 75 (1840) 113-.
- Apjohn, Jas. [1837-38] Ir. Ac. T. 18 (1838) 1-; Ir. Ac. P. 1 (1841) 206-.
- Regnault, G. Moigno Cosmos 2 (1853) 539-.
- Schmidt, G. Dingler 200 (1871) 19-.
- Berthelot, M. Rv. Sc. 17 (1879) 6-.
- Margules, M. Wien Az. 25 (1889) 135-.
- Lussana, S. N. Cim. 36 (1894) 5-, 70-, 130-; 1 (1895) 327-; 3 (1896) 92-; Ven. I. At. (1896-97) 1018-; N. Cim. 6 (1897) 81-; 7 (1898) 365-.
- Petrini, H. Z. Ps. C. 16 (1895) 97-.
- Leduc, A. C. R. 127 (1898) 860-; A. C. 17 (1899) 484-.
- at constant volume. Cazin, A. Les Mondes 20 (1869) 672-.
- , —, Moutier, J. C. R. 71 (1870) 807-.
- , —, Joly, J. R. S. P. 45 (1889) 33-.
- , —, Bickerton, —. Aust. As. Rp. (1891) 117.
- , —, measurement. Graf, J. H. Bern Mt. (1880) 71-.
- , —, —, new method. Akin, (Dr.) C. K. Ph. Mg. 27 (1864) 341-.
- , —, variation. Wüllner, F. H. A. A. A. Ps. C. 4 (1878) 321-.
- error in Apjohn's formula. Hudson, H. Ph. Mg. 8 (1836) 21-.
- at high temperatures. Berthelot, M., & Vieille, —. C. R. 98 (1884) 770-.
- , —, Mallard, E., & Le Chatelier, H. Par. S. Ps. Sé. (1888) 308-.
- , —, Stimpfl, G. Dingler 290 (1893) 213-, 235-.
- , —, Fliegner, A. Zür. Vjschr. 44 (1899) 192-.

1640 Specific Heat of Gases and Vapours.

Atomic Heat 1660

- laws. *Amagat, E. H.* C. R. 130 (1900) 1443-
measurement, new method. *Wiedemann, E.*
E. G. Arch. Sc. Ps. Nt. 51 (1874) 73-;
56 (1876) 273; A. Ps. C. 157 (1876) 1-
and properties of isothermals. *Amagat, E. H.*
C. R. 122 (1896) 120-
— refractive power of gases, relation. *Avogadro,*
A. [1817-26] Mod. Mm. S. It. 18 (1818)
154-; *Tor. Mm. Ac.* 33 (1829) 49-
variation. *Prevost, P.* Gen. Mm. S. Ps. 4
(1828) 255-, 479-
— *Winkelmann, A. A.* A. Ps. C. 159 (1876)
177-
— *Wittwer, W. C.* Z. Mth. Ps. 24 (1879)
193-
— *Linde, C.* Münch. Ak. Sb. 27 (1898) 485-
— *Sohncke, L.* A. Ps. C. 66 (1898) 111-

SPECIFIED GASES.

- air. *Thomson, (Sir) W.* Camb. and Dubl.
Mth. J. 8 (1853) 250-
— *Kurz, A.* A. Ps. C. 151 (1874) 173-
— *Casalonga, D. A.* Par. Ing. Civ. Mm.
(1878) 109-
— *Kurz, A.* Exner Rpm. 20 (1884) 161-
—, carbon dioxide and hydrogen at constant
volume. *Joly, J.* [1890] Phil. Trans. (A)
182 (1892) 73-
— at constant pressure. *Joule, J. P.* Ph.
Mg. 6 (1853) 143-
— — *Leduc, A.* C. R. 126 (1898)
1860-
— — — volume. *Kohlrausch, F.* A. Ps. C.
136 (1869) 618-
— — — *Witte, L.* A. Ps. C. 138 (1869)
155-; 140 (1870) 657-; 141 (1870) 317-
— — — (Kohlrausch). *Kurz, A.* A. Ps.
C. 138 (1869) 335-
— and steam. *Rankine, W. J. M.* [1850-57]
Edinb. R. S. T. 20 (1853) 191-; Edinb. R.
S. P. 3 (1857) 5-, 287-
carbon dioxide, compressed. *Margules, M.*
Wien Ak. Sb. 97 (1899) (Ab. 2a) 1385-
— at constant volume. *Joly, J.* [1894]
Phil. Trans. (A) 185 (1895) 943-
— — —, as function of temperature.
Joly, J. [1894] Phil. Trans. (A) 185 (1895)
961-
— —, variation at high temperatures. *Valérius,*
H. Brux. Ac. Bil. 48 (1879) 601-
chlorine. *Kundt, —.* D. Nf. Tbl. (*1879) 184.

SPECIFIC HEATS OF VAPOURS.

- Lubbock, J. W.* Ph. Mg. 31 (1847) 90-; 9
(1855) 25-
(saturated.) *Moutier, J. J.* de Ps. 2 (1873) 178-
(—) *Müller, J. J.* A. Ps. C. (Jubelbd.) (1874)
227-
(—) *Poinier, P. P.* Franklin I. J. 69 (1875)
227-
(variation.) *Wiedemann, E. E. G.* A. Ps. C.
2 (1877) 195-
Pellat, H. J. de Ps. 7 (1878) 117-
(saturated.) *Waals, J. D. van der.* Amst. Ak.
Vs. M. 12 (1878) 169-; A. Ps. C. Beibl. 2
(1878) 328-.

- (saturated.) *Bouty, E.* J. de Ps. 4 (1885) 28-
Morera, G. Rm. R. Ac. Linc. Rd. 7 (1891)
(Sem. 2) 119-
(saturated.) *Mathias, E.* C. R. 119 (1894) 849-;
Toul. Fac. Sc. A. 12 (1898) E, 17 pp.

SPECIFIED VAPOURS.

- acetic acid and nitrogen tetroxide. *Threlfall,*
R. Ph. Mg. 23 (1887) 223-
ether. *Tsuruta, K.* Ph. Mg. 48 (1899) 288-
mercury. *Kundt, A., & Warburg, E.* [1875]
A. Ps. C. 157 (1876) 353-
— *Naumann, A.* Berl. B. 8 (1875) 1063-
— (Naumann). *Kundt, A., & Warburg, E.*
Berl. B. 8 (1875) 1514-
steam. *Stefan, J.* Pogg. A. 110 (1860) 593-
— *Gray, J. M. F. L.* Ps. S. P. 5 (1884)
87-; Ph. Mg. 13 (1882) 337-
— *Antoine, C.* C. R. 109 (1889) 366-
— *Tumlirz, O.* Wien Ak. Sb. 108 (1899)
(Ab. 2a) 1395-
—, applied to steam engine theory. *Frank, A.*
Hann. Archt.-Vr. Z. 37 (1891) 337-
— at constant pressure. *Tumlirz, O.* Wien
Ak. Sb. 106 (1897) (Ab. 2a) 654-
—, superheated. *Ewing, J. A., & Dunkerley,*
S. B. A. Rp. (1897) 554-
water vapour and carbon dioxide at high
temperatures. *Berthelot, M., & Vieille, —.*
C. R. 98 (1884) 852-.

- Steam in gas generators. *Schoeffel, R.* Berg-
Hm. Ztg. 43 (1884) 205.
— — —, use, thermochemistry. *Schmidt,*
A. Berg-Hm. Ztg. 43 (1884) 25-
Temperature, law. *Meikle, H.* Thomson A.
Ph. 12 (1826) 366-
Vapours, total heat. *Antoine, C.* A. C. 26
(1892) 426-.

1660 Chemical Constitution and Specific Heat (Dulong and Petit Law, etc.). (See also Chemistry 7220.)

ATOMIC HEAT.

- Hermann, R.* Mosc. S. Nt. N. Mm. 3 (1834)
135-
Schmidt, G. [1865] Wien Sb. 52 (1866) (Ab. 2)
417-
Aluimov, I. P. [1872] (xii) Rs. C. Ps. S. J.
5 (Pt. 1) (1873) 63-
Rabuteau, —. Par. S. Bl. Mm. 34 (*1882)
(C. R.) 376-
Additivity. *Meyer, S.* Wien Ak. Sb. 109
(1900) (Ab. 2a) 405-
Atomic heat of gases, expansion and mechanical
equivalent. *Violi, A.* Rm. R. Ac. Linc. T.
7 (1883) 243-
— and kinetic theory of gases. *Donnini, P.*
N. Cim. 5 (1879) 97-
Calculation on mechanical theory of heat.
Sandrucci, A. Rv. Sc.-Ind. 18 (1886) 129-.

1660 Atomic Heat

DULONG AND PETIT LAW.

- Potter, R.* Edinb. J. Sc. 5 (1831) 75-.
- Stefan, J.* Wien SB. 36 (1859) 85-.
- Moutier, J.* [1876] Par. S. Phlm. Bll. 1 (1877) 3-.
- Willotte, H.* C. R. 89 (1879) 540-, 568-.
- Moutier, J.* Rv. Sc. 18 (1880) 1174-; Par. Éc. Pol. J. Cah. 53 (1883) 31-.
- Rydberg, V. R.* Sk. Nf. F. (1892) 364-.
- Richarz, F. A.* Ps. C. 48 (1893) 708-; 67 (1899) 702-.
- exceptions. *Carbonelli, C. E.* Genova S. Lig. At. 3 (1892) 3-.
- and mechanical theory. *Mann, F.* Würzb. Ps. Md. Sb. (1890) 91-, 97-.
- probable extension. *Cantoni, G.* Rm. R. Ac. Linc. Rd. 2 (1886) (Sem. 2) 3-.
- theoretical deduction. *Staigmüller, H. A.* Ps. C. 65 (1898) 670-.
- variation. *Hirn, G. A.* C. R. 76 (1873) 191-.
- and Westyn's law, mechanical interpretation. *Ledieu, A. C. H.* C. R. 78 (1874) 30-.
- Naumann's theory.* *Budde, E.* Bonn SB. Niedr. Gs. 27 (1870) 101-; D. C. Gs. B. 3 (1870) 726-.

Atomic volume, constant, consequences of hypothesis. *Buys-Ballot, C. H. D.* Utr. Prv. Gn. Aant. (1881) 6-.

Composition of vapours, calculation from their coefficients of expansion and latent heats of liquefaction. *Langlois, M.* C. R. 102 (1886) 1231-.

Molecular heat of bodies. *Cantoni, G.* Rm. R. Ac. Linc. Rd. 2 (1886) (Sem. 2) 43-.

— — — dissociable gaseous compounds. *Ponsot, —.* C. R. 131 (1900) 990-.

— — — gases. *Le Chatelier, H.* C. R. 104 (1887) 1780-.

— — — polyatomic gases. *Fliegener, A.* Zür. Vjschr. 45 (1900) 137-.

Specific heat of compound gases. *Avogadro, A.* Bb. It. 4 (1816) 478-; 5 (1817) 73-; Bb. Un. 29 (1840) 142-.

— — — and density. *Sluginov, N. P.* Rs. Ps. C. S. J. 19 (Ps.) (1887) 17-.

— — — laws. *Dupré, A.* C. R. 58 (1864) 163-.

— — — of metals. *Waterman, F. A.* Ps. Rv. 4 (1897) 161-.

Thermal capacity of gases, and their composition. *Mollet, J.* J. de Ps. 90 (1820) 113-.

— — — — — law. *Sluginov, N. P.* J. de Ps. 9 (1880) 48-.

— — — — — molecular velocity and melting point of an element. *Sandrucci, A. N.* Cim. 19 (1886) 64-.

1670 Heats of Fusion.

Despretz, C. C. R. 11 (1840) 806-; Pogg. A. 52 (1841) 177-.

Person, C. C. C. R. 23 (1846) 162-, 336-; A. C. 21 (1847) 295-; 24 (1848) 129-; 27 (1849) 250-.

Heats of Fusion 1670

(Person.) *Delarive, A.* Bb. Un. Arch. 9 (1848) 5-.

Person, C. C. C. R. 29 (1849) 300-; Pogg. A. 74 (1849) 409-, 509-; 76 (1849) 426-, 586-.

Morris, C. J. Sc. 3 (1881) 584-, 640-.

Change of state, theory of disappearance of heat. *Irvine, W.* Nicholson J. 6 (1803) 25-.

— — — — — variation in heat. *Moutier, J.* [1877] Par. S. Phlm. Bll. 2 (1878) 68-.

Heat of fusion and pressure. *Tammann, G.* A. Ps. C. 67 (1899) 871-.

— — — — — thermal capacity. *Pickering, S. U.* R. S. P. 49 (1891) 11-.

Latent heat, anomalous result of liberation. *Erman, P.* Berl. Ab. (1825) 107-.

— — — — — coefficient of elasticity. *Person, C.* C. C. R. 27 (1848) 258-; A. C. 24 (1848) 265-.

— — — — — of freezing, and means of utilising. *Lecoq, H.* Auvergne A. Sc. 24 (1851) 432-.

— — — — — liquids and vapours. *Dyer, J. C.* Manch. Lt. Ph. S. P. 7 (1868) 198-.

— — — — — and sensible heat. *Vermehr, J. L. H. C.* Leijd. A. Ac. (1830-31) 42 pp.

— — — — — of water below 0°, with remarks on formation of ice in sea. *Pettersson, O.* Stockh. Öfv. 35 (1878) No. 2, 53-; A. Ps. C. Beibl. 2 (1878) 399-.

SPECIFIED SUBSTANCES.

Aluminium. *Pionchon, J.* C. R. 115 (1892) 162-, 270.

Benzene. *Demerliac, —.* As. Fr. C. R. (1894) (Pt. 2) 325-.

Binary alloys of lead, tin, bismuth and zinc. *Mazzotto, D.* Mil. I. Lomb. Mm. 16 (1891) 1-.

— — — mixtures. *Battelli, A., & Martinetti, M.* Rm. R. Ac. Linc. Rd. 1 (1885) 621-.

Formic and acetic acids, crystallisation. *Pettersson, O.* Stockh. Öfv. 35 (1878) No. 9, 17-.

Ice. *Desains, P., & La Provostaye, F. de.* C. R. 16 (1843) 837-; Pogg. A. 59 (1843) 163-; 62 (1844) 30-.

— — — *Wartmann, É.* [1844] Laus. Bll. S. Vd. 1 (1842-45) 287-.

— — — *Hess, H.* [1848] St. Pét. Ac. Sc. Bll. 9 (1851) 81-.

— — — *Person, C. C.* C. R. 30 (1850) 526-; A. C. 30 (1850) 73-.

— — — *Ångström, A. J.* Pogg. A. 90 (1853) 509-.

— — — *Jamin, J.* C. R. 70 (1870) 715-.

— — — *Langlois, M.* C. R. 102 (1886) 1451-.

— — — *Zakrzewski, I.* [1892] Krk. Ak. (Mt.-Prz.) Rz. 4 (1893) 247-; A. Ps. C. 47 (1892) 155-.

— — — experiments of Laplace and Lavoisier. *Renou, E.* C. R. 70 (1870) 929-, 1043.

— — — — — (Renou). *Jamin, J.* C. R. 70 (1870) 969-.

Lead and tin and alloys. *Rudberg, F.* Stockh. Ak. Hndl. (1829) 157-; Pogg. A. 18 (1830) 240-; 19 (1830) 125-.

- Mercury. *Person, C. C.* C. R. 25 (1847) 334-;
A. C. 24 (1848) 257-.
— *Langlois, M.* C. R. 103 (1886) 1009-.
Pig-iron and other metals. *Minary, —, & Résal, —.* A. Mines 19 (1861) 401-.
Platinum. *Violle, J. L. G.* [1877] (xii) Isère S. Bll. 8 (1879) 20-, 107-.
Wax, metals, etc. *Irvine, W.* Nicholson J. 9 (1804) 45-.

1680 Heats of Vaporisation.

- Despretz, C.* A. C. 24 (1823) 323-.
Person, C. C. C. R. 17 (1843) 495-.
Andrews, T. [1847] C. S. J. 1 (1849) 27-.
Legrand, J. N. C. R. 42 (1856) 213-.
Groshans, J. A. Arch. Néerl. 5 (1870) 1-, 193-.
Moutier, J. Par. S. Phlm. Bll. 1 (1877) 17-;
4 (1880) 247-.
Puschl, K. [1880] Wien Ak. Sb. 82 (1881) (Ab. 2) 1102-.
Morris, C. J. Sc. 3 (1881) 584-, 640-.
Walter, A. [1881] A. Ps. C. 16 (1882) 500-.
Bouty, E. J. de Ps. 4 (1885) 26-.
Fuchs, K. Exner Rpm. 26 (1890) 345-.
Jäger, G. Wien Ak. Sb. 100 (1891) (Ab. 2a) 1122-.
Bakker, G. Z. Ps. C. 10 (1892) 558-.
Tsuruta, K. J. de Ps. 2 (1893) 272-.
Pagliani, S. N. Cim. 2 (1895) 312-.
Louguinine, W. A. C. 7 (1896) 251-.
Milner, S. R. Ph. Mg. 43 (1897) 291-, 464.
Thiesen, M. Berl. Ps. Gs. Vh. (1897) 80-.
Groshans, J. A. A. Ps. C. 64 (1898) 778-.
Louguinine, W. A. C. 13 (1898) 289-.
Caloric, quantity necessary to produce equal volumes of vapours. *Apjohn, Jas.* Ir. Ac. P. 5 (1853) 272-.
Change of state, theory of disappearance of heat. *Irvine, W.* Nicholson J. 6 (1803) 25-.
— — — variation in heat. *Moutier, J.* [1877] Par. S. Phlm. Bll. 2 (1878) 68-.
Heat of gases and vapours. *Poisson, S. D.* A. C. 23 (1823) 337-.
— — — vaporisation, and expansion. *Groshans, J. A.* A. Ps. C. 64 (1898) 789-.
— — — influence of electrification. *Fontaine, É.* J. de Ps. 6 (1897) 16-.
— — — and internal condition. *Puschl, K.* Wien Ak. Sb. 75 (1877) (Ab. 2) 745-.
— — — specific heat; and alcoholic engines. *Meikle, H.* Tilloch Ph. Mg. 68 (1826) 34-.
— — — theory of elastic fluids. *Pouillet, C. S. M.* C. R. 24 (1847) 915-.
— — — vapour density found by vapour calorimeter. *Allen, H. N.* [1890] Nebr. Un. Stud. 1 (1888-92) 195-.
— — — pressures. *Rodzevič, N. M.* Rs. Ps.-C. S. J. 80 (Ps.) (1898) 183-; J. de Ps. 9 (1900) 55-.
Latent and specific heat of water-vapour as means of heating. *Taddei, G.* (xii) Firenze Ac. Georg. At. 11 (1833) 65-.
Law. *Person, C. C.* C. R. 23 (1846) 524-.
— *Le Chatelier, H.* Par. S. C. Bll. 47 (1887) 4, 289.
— *Tamirz, O.* Wien Ak. Sb. 101 (1892) (Ab. 2a) 184-.

- Law, Van der Waals's.* *Darzens, G.* C. R. 124 (1897) 610-.
Measurement. *Trouton, F.* Nt. 30 (1884) 187.
— *Pagliani, S.* Rm. R. Ac. Linc. Rd. 3 (1894) (Sem. 1) 249-.
— *Louguinine, —.* Par. S. Ps. Sé. (1899) 66*-.
— at 0° C. by Bunsen's ice calorimeter. *Svensson, A.* Stockh. Ötv. (1895) 537-;
Fschr. Ps. (1895) (Ab. 2) 398.
— by calorimetry. *Mathias, E.* C. R. 106 (1888) 1146-.
— — steam calorimeter. *Wirtz, K.* A. Ps. C. 40 (1890) 438-.
Relation to other magnitudes. *Kraevič, K. D.* Rs. Ps.-C. S. J. 21 (Ps.) (1889) 137-; J. de Ps. 9 (1890) 535.
— — — physical properties. *Aubel, E. van.* J. de Ps. 5 (1896) 70-.
— — — pressure. *Clausius, R.* Pogg. A. 82 (1851) 274-.
— — — temperature. *Heen, P. de.* Brux. Ac. Bll. 8 (1884) 210-.
— — — and pressure. *Ure, Andr.* Phil. Trans. (1818) 338-.
— — — — (Ure). *Tredgold, T.* Tilloch Ph. Mg. 66 (1825) 277.
— — — — *Linebarger, C. E.* Am. J. Sc. 49 (1895) 380-.
— — — thermal capacity of liquids. *Nadeždin, A. I.* [1885] Kiev S. Nt. Mm. 8 (1) (1886) ii-.

SPECIFIED SUBSTANCES.

- Air and carbon dioxide. *Behn, U.* A. Ps. 1 (1900) 270-.
Ammonia, liquefied. *Strombeck, H.* von Franklin I. J. 130 (1890) 467-; 131 (1891) 470-.
Benzene. *Griffiths, E. H., & Marshall, (Miss) D.* [1895] L. Ps. S. P. 14 (1896) 16-; Ph. Mg. 41 (1896) 1-.
Carbon dioxide near critical temperature. *Mathias, E.* C. R. 109 (1889) 470-.
Hydrochloric acid. *Tsuruta, K.* Ph. Mg. 35 (1893) 435-.
Liquefied gases. *Mathias, E.* A. C. 21 (1890) 69-; Par. S. Ps. Sé. (1890) 122-.
— — — *Bakker, G.* J. de Ps. 6 (1897) 131-.
Liquids at boiling points. *Marshall (Miss) D., & Ramsay, W.* [1895] L. Ps. S. P. 14 (1896) 57-; Ph. Mg. 41 (1896) 38-.
Mercury. *Langlois, M.* C. R. 103 (1886) 1009-.
Organic compounds. *Jahn, H.* Z. Ps. C. 11 (1893) 787-.
Volatile bodies, relation between latent heat, specific heat and specific volume. *Trouton, F. T.* Nt. 27 (1883) 292.
— liquids. *Chappuis, J.* C. R. 104 (1887) 897-; 106 (1888) 1007-; A. C. 15 (1888) 498-.
Water. *Pambour, F. M. G. de.* Pogg. A. 59 (1843) 587-.
— *Murphy, J. J.* (xii) Belfast NH. S. P. (1875-76) 42-.

1690 Heats of Transformation

- Water (at 0°). *Dieterici, C.* A. Ps. C. 37 (1889) 494-.
- , *Ekholm, N.* Stockh. Ak. Hndl. Bh. 15 (Afd. 1) (1890) No. 6, 35 pp.
- , *Hartog, P. J., & Harker, J. A.* [1893] Nt. 49 (1893-94) 5.
- , *Griffiths, E. H.* [1895] Phil. Trans. (A) 186 (1896) 261-.
- , *Nipher, F. E.* St. Louis Ac. T. 6 (1895) xvi.
- , *Harker, J. A.* Manch. Lt. Ph. S. Mm. & P. 10 (1896) 38-.
- from saturated salt solutions. *Trouton, F. T.* [1899] Ir. Ac. T. 31 (1896-1901) 345-.
- Zinc and cadmium. *Sutherland, W.* Ph. Mg. 46 (1898) 345-.

1690 Heats of Dissolution.

(See also Chemistry 7230.)

- Ammonia, heat of absorption by water. *Strombeck, H. von.* Franklin I. J. 131 (1891) 71-.
- Heat of dissolution of gases in liquids. *Pickering, S. U.* Ph. Mg. 34 (1892) 35-.
- solution, especially of $\text{CdSO}_4 \cdot 8/3 \text{H}_2\text{O}$. *Holsboer, H. B.* [1900] Amst. Ak. Vs. 9 (1901) 399-; Amst. Ak. P. 3 (1901) 467-.

1695 Heats of Transformation.

- Moutier, J.* C. R. 76 (1873) 365-.
- Alloys, heat of combination of metals in formation. *Galt, A. B.* A. Rp. (1898) 787-.
- , —, —, —, —. *Brit. Ass. Comm.* B. A. Rp. (1899) 246-.
- , thermal changes in formation. *Mazzotto, D.* Mil. I. Lomb. Rd. 18 (1885) 165-.
- Ammonium nitrate. *Bellati, M., & Romanese, R.* Ven. I. At. (1885-86) 1395-.
- Coagulation of milk. *Berninzone, M. R.* Genova S. Lig. At. 11 (1900) 277-.
- Iron and steel at a bright red heat, peculiarities. *Newall, H. F.* Ph. Mg. 24 (1887) 435-.
- , —, critical points. (Latent heat of hardening.) *Osmond, F. I. & S. I. J.* (1890) (No. 1) 38-.
- wire, molecular changes at low red heat. *Barrett, W. F.* Ph. Mg. 46 (1873) 472-.
- Metals, change of condition at high temperatures. *Pionchon, —.* A. C. 11 (1887) 33-.
- Potassium nitrate. *Bellati, M., & Romanese, R.* Ven. I. At. (1884-85) 653-.
- , temperature of transformation in presence of other nitrates. *Bellati, M., & Lussana, S.* Ven. I. At. (1890-91) 995-.

RECALESCENCE.

- Shand, R.* Tel. J. 26 (1890) 247.
- investigation methods. *Smith, F. J.* Ph. Mg. 31 (1891) 433-.
- iron. *Forbes, G.* [1874] Edinb. R. S. P. 8 (1875) 363-.
- , *Tomlinson, H.* L. Ps. S. P. 9 (1888) 107-; Ph. Mg. 25 (1888) 103-.
- , *Hopkinson, J.* R. S. P. 45 (1889) 455-.

Change of State 1800

- iron. *Thomson, E.* Tel. J. 24 (1889) 471.
- , *Terešin, S. J., & Rozing, B. L.* Rs. Ps. C. S. J. 26 (Ps.) (1894) 200-.
- and steel, anomalous changes during recalescence. *Svedelius, G. E.* Jern-Kont. A. 51 (1897) 202-; Ph. Mg. 46 (1898) 173-.
- and magnetism. *Hopkinson, J.* R. S. P. 48 (1891) 442-.
- steel. *Newall, H. F.* Ph. Mg. 25 (1888) 510-.
- , *Thomson, E.* Tel. J. 24 (1889) 616-.
- Silver and copper sulphides and selenides. *Bellati, M., & Lussana, S.* Ven. I. At. (1888-89) 1051-.
- iodide, dimorphism. *Mallard, E., & Le Chatelier, —.* Par. S. Ps. Sé. (1885) 18-.

PHENOMENA OF CHANGE OF STATE.

1800 General.

- Wills, T.* Phm. J. 5 (1875) 990-.
- Berthelot, M.* Rv. Sc. 17 (1879) 6-.
- Absorption of gases, resulting change in density and volume of liquid. *Ångström, K.* Stockh. Öfv. (1887) 415-.
- Artificial rain. *Errera, L.* [1896] Ciel et Terre 17 (1896-97) 353-.
- Bodies in gaseous and cloudy states. *Ladame, H.* [1859] Neuch. Bil. 5 (1859-61) 155-.
- Calorimetric study of a salt. *Monnet, E.* Bordeaux S. Sc. PV. (1896-97) 15-; Bordeaux S. Sc. Mm. 3 (1899) 41-.
- Carbon dioxide, solid, experiment. *Prytz, K.* Ph. Mg. 39 (1895) 308.
- Change of state as affecting communication of heat. *Gill, J.* Ph. Mg. 32 (1866) 420-.
- , —, effect of pressure. *Ponsot, A. C.* R. 123 (1896) 595-.
- , —, and free energy. *Moutier, J.* Par. Éc. Pol. J. 57 (1887) 99-.
- Condensers, theory. *Dwelschauvers-Dery, V.* Rv. Un. Mines 5 (1889) 225-.
- Density of saturated vapour and laws of solidification and evaporation of solvent. *Raoult, E. M.* Z. Ps. C. 13 (1894) 187-.
- Disintegration of electrically heated platinum and palladium wire. *Stewart, W. A.* Ps. C. 66 (1898) 88-.
- , —, —, wires, and metallic vapours formed. *Toepler, M.* A. Ps. C. 65 (1898) 873-.
- , —, glowing metals. *Berliner, A.* A. Ps. C. 33 (1888) 289-.
- , —, platinum. *Kayser, H.* A. Ps. C. 34 (1888) 607-.
- Evaporation, melting and sublimation. *Planck, M.* A. Ps. C. 15 (1882) 446-.
- Forms taken by bodies during dissolution in fluids. *Bartoli, A., & Papasogli, E. G.* [1885] Pisa S. Tosc. At. (Mm.) 7 (1886) 134-.
- Freezing as an aid to sinking foundations. *Reichenbach, O.* B. A. Rp. (1886) 799-.
- , —, —, shafts. *Lebreton, F. A.* Mines 8 (1885) 111-.

1800 Change of State

Gases and vapours. *Tilman, H. J.* Liège A. Ac. (1822-23) 61 pp.
— — — *Dove, H. W.* Pogg. A. 23 (1831) 290-.

HEAT DEVELOPED ON MOISTENING SOLIDS, POUILLET'S PHENOMENON.

Pouillet, C. S. M. A. C. 20 (1822) 141-.
Fibrous substances. *Cobbett, L.* Camb. Ph. S. P. 10 (1900) 372-.
Porous solids. *Cantoni, G.* Mil. I. Lomb. Rd. 3 (1866) 135-.
Powders. *Meissner, F.* A. Ps. C. 29 (1886) 114-.
— *Martini, T.* Ven. I. At. (1896-97) 502-.
— *Lagergren, S.* [1898] Stockh. Ak. Hndl. Bh. 24 (Afd. 2) (1899) No. 5, 14 pp.
— *Martini, T.* Ven. I. At. (1897-98) 927-.
— *Ercolini, G.* N. Cim. 9 (1899) 110-.
— (Ercolini). *Martini, T.* N. Cim. 9 (1899) 334-.
— (Martini). *Ercolini, G.* N. Cim. 9 (1899) 446-.
— (Ercolini). *Martini, T.* N. Cim. 10 (1899) 42.
— *Martini, T.* Ven. I. At. (1899-1900) (Pt. 2) 615-.
— *Bellati, M.* Ven. I. At. (1899-1900) (Pt. 2) 931-.

Heat required to raise elementary bodies from absolute zero to state of fusion. *Schenk, R.* B. A. Rp. 42 (1872) (Sect.) 82-.
Ice divide, movement during melting of inland ice. *Schiptz, O. E.* N. Mg. Ntvd. 34 (1895) 102-.
— formation, mathematical theory. *Stefan, J.* Mh. Mth. Ps. 1 (1890) 1-.
Liquid and gaseous states. *Golicyn, B.* Fshr. Ps. (1889) (Ab. 2) 209.
— — — *Heen, P. de.* Brux. Ac. Bil. 27 (1894) 885-.
Matter, condition under extreme heat or cold. *Anon.* (vi 180) Bb. It. 80 (1835) 285-.
— forces determining condition. *Eyk, S. S. van der.* Holland. Mg. 1 (1803) 241-.
— 3 states. *Volpicelli, P.* Rm. At. 1 (1847-48) 129-.
— different states. *Bogaevskij, L.* St. Pét. Ac. Sc. Mm. 5 (1897) No. 13, 104 pp.
Orthobaric curves for homogeneous fluids, concordance. *Natanson, W.* Krk. Ak. (Mt.-Prz.) Rz. 3 (1891) 390-.
Physico-chemical matters. *Bellani, A.* (vi Adds.) Majocchi A. Fis. C. 1 (1841) 269-.
Priority of some observations and experiments. *Bellani, A.* (vi Adds.) Majocchi A. Fis. C. 18 (1845) 49-.
Solidification and evaporation of liquids in form of drops. *Sluginov, N. P.* (xn) Rs. Ps.-C. S. J. 12 (Ps.) (1880) [(Pt. 1)] 172-.
Solution of solids in gases. *Villard, P.* C. R. 120 (1895) 182-.
— — — — *Arctowski, H.* Z. Anorg. C. 12 (1896) 413-.
— — — and liquids in gases. *Villard, P.* Par. S. Ps. Sé. (1896) 234-.

Fusion and Solidification 1810

Thermal and anti-thermal lines. *Oumoff, —.* Par. S. Ps. Sé. (1896) 212.
Transition cell, new kind. *Cohen, E.* Mbl. Nt. (1898) 17-.
— — — way of using. *Cohen, E., & Bredig, G.* [1894] Mbl. Nt. (1894-95) 31-.
— temperatures in electromagnetic field. *Du Bois, H.* Berl. Ps. Gs. Vh. (1898) 148-.
Vacua, high, application of liquid hydrogen to production. *Devar, J.* [1898] R. S. P. 64 (1899) 231-.
Vapours, theory. *Résal, H.* C. R. 73 (1871) 325-.
Vulcanism. *Arrhenius, S.* Stockh. Gl. För. F. 22 (1900) 395-.
Water, explosion. *Smyth, C. P.* [1873] Manch. Lt. Ph. S. P. 13 (1873-74) 41-.
—, fundamental properties as solid, liquid and gas. *Kramer, A. de.* Il Polit. 1 (1839) 297-.

1810 Fusion and Solidification (General).

(See also Chemistry 7205.)

Poynting, J. H. Birm. Ph. S. P. 2 (1881) 354-.
Adhesion at melting point. *Wald, E.* Z. Ps. C. 7 (1891) 514-.
Alloys, fusibility. *Le Chatelier, —.* Par. S. Ps. Sé. (1894) 266.
—, fusion. *Person, C. C.* C. R. 23 (1846) 926-.
—, lead tin, fusion. *Wiesengrund, B.* A. Ps. C. 52 (1894) 777-.
Amalgams, liquefaction. *Mazzotto, D.* Ven. I. At. (1892-93) 1527-.
—, solidification. *Mazzotto, D.* Ven. I. At. (1892-93) 1311-.
Bismuth, behaviour on solidification. *Marx, C. M.* Schweigger J. 58 (= Jb. 28) (1830) 454-.
—, fused, anomalous density. *Lüdeking, C.* A. Ps. C. 34 (1888) 21-.
Bubble formation in frozen liquids. *Karsten, G.* [1893] Schl.-Holst. Nt. Vr. Schr. 10 (1895) 309-.
Colloidal reversible systems, gelation. *Hardy, W. B.* R. S. P. 66 (1900) 95-.
Electric currents, fusion of metals by. *Joule, J. P.* [1856] Manch. Ph. S. Mm. 14 (1857) 49-.
Energy- and volume-surfaces of crystal in solid and liquid state. *Tammann, G.* Z. Ps. C. 21 (1896) 17-; Dorpat Sb. 12 (1901) 270-; A. Ps. 1 (1900) 275-; Arch. Néerl. 5 (1900) 108-.
Extrusion of freezing water from earth. *Thomson, (Prof.) James.* B. A. Rp. 41 (1871) (Sect.) 34.
Fire clays, fusibility. *Hofman, H. O.* [1895-98] Am. I. Mn. E. T. 25 (1896) 3-; 28 (1899) 435-.
— — — *Hofman, H. O., & Stoughton, B.* [1898] Am. I. Mn. E. T. 28 (1899) 440-.
— — — refractoriness. *Hofman, H. O., & Demond, C. D.* [1894] Am. I. Mn. E. T. 24 (1895) 42-, 846-.

FREEZING.

- Despretz, C. C. R.* 5 (1837) 19-.
- of alcohol. *Walker, Rich.* *Tilloch Ph. Mg.* 42 (1813) 117-.
- artificial. *Fourcroy, A. F. de, & Vauquelin,* —. *A. C.* 29 (1798) 281-.
- and boiling. *Dufour, C.* *Moigno Cosmos* 18 (1861) 650-.
- of water. *Majocchi, G. A.* (vi *Adds.*) *Majocchi A. Fis. C.* 1 (1841) 272-.
- — simultaneously. *Quick, R. W.* *Ps. Rv.* 9 (1899) 121-.
- — in *vacuo.* *Bohnenberger, G. C.* *Tübinger Bl.* 1 (1815) 113-.
- cavern at Orenburg, phenomena. *Hope, T. C.* [1843] *Edinb. R. S. P.* 1 (1845) 429-.
- of colloids. *Ambrom, H.* *Leip. Mth. Ps. B.* 43 (1891) 28-.
- and cooling of liquids. *Perkins, J.* *Lieb. A.* 22 (1837) 214-.
- crystallisation, phenomena. *Bellani, A.* *Brugnatelli G.* 10 (1827) 190-, 253-.
- experiments on sea-water and magnetic fluid. *Sanctis, B. de.* *Tilloch Ph. Mg.* 60 (1822) 199-.
- and ice crystals. *Galli, I.* *Rm. N. Linc. Mm.* 11 (1895) 25-.
- Leslie's process. *Clément, —, & Désormes,* —. *A. C.* 78 (1811) 183-.
- machine, with Pictet's fluid. *Helmholtz, H. von.* *Berl. Ps. Gs. Vh.* (1887) 97-, 112-.
- — — (Helmholtz). *Pictet, R.* *Berl. Ps. Gs. Vh.* (1887) 105 (bis)-.
- , — sulphurous acid. *Pictet, R.* *Mon. Sc.* 18 (1876) 744-.
- and melting. *Aitken, J. (of Darroch).* [1875] *Sc. S. Arts T.* 9 (1878) 240-.
- of water. *Mousson, A.* *Pogg. A.* 105 (1858) 161-.
- — —, causes. *Dyer, J. C.* [1861] *Manch. Ph. S. P.* 2 (1860-62) 43-.
- — — in small vessel, and geode of ice filled with liquid. *Dauger, —, & Viquesnel,* —. *Fr. S. Mét. An.* 11 (*1863) Pt. 2, 160-.
- of mercury. *Anon.* (vi 939) *Par. Éc. Pol. J.* (1^o cah.) (1795) 123-.
- —. *Waha, M. de.* *Lux. I. Ph.* 17 (1879) 191-.
- , by natural cold. *Hall, E.* *Silliman J.* 31 (1837) 161-.
- metals, Réaumur's experiments. *Longmire, J. B.* *Thomson A. Ph.* 5 (1823) 343.
- and purification of water. *Bizio, G. A.* *Sc. Lomb. Ven.* 12 (1842) 33-.
- of rivers. *Arago, D. F. J.* *Par. Bur. Long. An.* (1828) 174-.
- of water. *Heller, T. E.* *Gilbert A.* 1 (1799) 474-.
- —. *Dispan, P.* *Nicholson J.* 15 (1806) 251-.
- —. *Kries, F.* *Pogg. A.* 52 (1841) 636-.
- —. *Boussingault, J. B.* *C. R.* 73 (1871) 77-.
- — (aerated). *Maw, G.* *Nt.* 35 (1887) 325-.
- —. *Bordas, F.* *C. R.* 130 (1900) 805-.
- —, abnormal, and corresponding vapour pressures. *Marvin, C. F.* [U. S. Chief Sig. Off. A. Rp. (1891)] 380-.
- — and bismuth. *Tribe, A. C. S. J.* 6 (1868) 71-.
- — covered with oil. *De la Beche, (Sir) H. T.* *Gilbert A.* 71 (1822) 435-.

- of water, expansion before. *Bellani, A.* *Brugnatelli G.* 1 (1808) 305-, 410-.
- —, expansive force. *Williams, (Major) E.* [1786] *Edinb. R. S. T.* 2 (1790) 23-.
- — —. *Anon.* (vi 1066) *QJ. Sc.* 1 (1830) 194-.
- —, microscopic study. *Link, H. F.* *Pogg. A.* 64 (1845) 479-.
- —, phenomena. *Bizio, B.* *Ven. At.* 6 (1860-61) 605-.
- — —. *Forel, F. A.* [1891] *Laus. S. Vd. Bll.* 27 (1892) xiii-.
- — in pipes. *Kemna, A.* *Brux. S. Blg. Gl. Bll.* (1893) (PV.) 55-.
- — — under salt water. *Wheildon, W.* *W. Am. As. P.* 19 (1870) 147-.
- —, pure and salt. *Dufour, L.* *Laus. Bll. S. Vd.* 4 (1854-55) 298-.
- —, or saturated with gas, rupture of containing vessels. *Barthélemy, A.* *A. C.* 23 (1871) 89-.
- — on thermometers. *Henrici, F. C.* *Pogg. A.* 47 (1839) 214-.
- — in *vacuo.* *Schrötter, A.* *Wien SB.* 10 (1853) 527-.
- — —, new method. *Smith, James L.* *Charleston South. J. Md.* 1 (1846) 149-.

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- determination. *Griffiths, E. H.* [1890] *Phil. Trans. (A)* 182 (1892) 43-.
- —. *Ponsot, A.* *Par. S. Ps. Sé.* (1897) 26-.
- of some gases and liquids. *Olzewski, K.* [1883] (xii) *Krk. Ak. (Mt.-Prz.) Rz. & Sp.* 11 (1884) LXVII-.
- liquids, specially sulphur. *Gernez, D. C.* *R.* 82 (1876) 1151-.
- mercury. *Stewart, B.* *Phil. Trans.* (1863) 425-.
- silver. *Heycock, C. T., & Neville, F. H.* *Nt.* 52 (1895) 596-.
- tin, and boiling point of mercury. *Crichton, Jas.* *Tilloch Ph. Mg.* 15 (1803) 147-.
- variation with pressure. *Clausius, R.* *Pogg. A.* 81 (1850) 168-.
- of water in capillary tubes. *Sorby, H. C.* *Ph. Mg.* 18 (1859) 105-.
- —, lowering by pressure. *Dewar, J.* *R. S. P.* 30 (1880) 533-.
- Frost, effects on lake of Joux. *Blanchet, R.* [1854] *Laus. Bll. S. Vd.* 4 (1854-55) 224-.
- proof water-pipes. *Boys, C. V.* [1881] *L. Ps. S. P.* 5 (1884) 40-; *Ph. Mg.* 13 (1882) 244-.
- , rupture of lead pipes by. *Coze, J. R.* *Thomson A. Ph.* 7 (1816) 234.
- Frozen wells. *Macomber, D. O.* *Silliman J.* 36 (1839) 184-.
- of Oswego. *Brocklesby, J.* *Am. As. P.* (1855) 175-.
- Fusion. *Poynting, J. H.* *L. Ps. S. P.* 4 (1881) 271-; *Ph. Mg.* 12 (1881) 32-, 232-.
- and solidification, duration. *Sluginow, N. P.* *Fsch. P.* (1894) (Ab. 2) 296.
- , theory. *Brillouin, M.* *A. C.* 13 (1898) 264-.

- Glacier grains. *Deeley, R. M.* Ph. Mg. 39 (1895) 453-.
- ice, formation from snow. *Ladame, H.* Neuch. Bil. 1 (1844-46) 267-.
- theory, and water and ice pressure. *Danneberg, R.* Zwick. Vr. Nt. Jbr. (1898) 1-.
- Glacier-like movement in snow particles. *Ashe, W. A.* Science 10 (1887) 180.
- Hydrogen, solidification. *Dewar, J. C. R.* 129 (1899) 451-.

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- alleged heating. *Carnelley, T.* [1880] Nt. 22 (1880) 434-; R. S. P. 31 (1881) 284-.
- —. *Le Conte, (Prof.) J.* Nt. 22 (1880) 603-.
- —. *Meyer, L.* Berl. B. 13 (1880) 1831-; 14 (1881) 718-.
- — (Meyer). *Pettersson, O.* Berl. B. 13 (1880) 2141-.
- —. *Colley, A.* (xn) Mosc. S. Sc. Bil. 41 (No. 1) (1881) 50-.
- —. *Stolyetov, A. G.* (xn) Mosc. S. Sc. Bil. 41 (No. 1) (1881) 51.
- —. *Lodge, O. J.* Nt. 23 (1881) 264-, 504-.
- —. *Carnelley, T.* Nt. 23 (1881) 341-.
- —. *Herschel, A. S.* Nt. 23 (1881) 383-.
- —. *Hannay, J. B.* Nt. 23 (1881) 505-.
- —. *Brutel de la Rivière, C. J. E., & Hasselt, A. van.* Nt. 24 (1881) 4-.
- —. *McLeod, H.* Nt. 24 (1881) 28-.
- —. *Pettersson, O.* Stockh. Öfv. 38 (1881) No. 6, 23-; Nt. 24 (1881) 167-.
- —. *Weinhold, A. F.* Carl Rpm. 17 (1881) 604-.
- —. *Wüllner, F. H. A. A.* A. Ps. C. 13 (1881) 105-.
- on bog lakes of Ireland, outlines of trees. *Chichester, —.* Nicholson J. 34 (1813) 343-.
- over corpse, peculiar appearance. *Nicholson, W.* Nicholson J. 34 (1813) 301-.
- — —. *Harrup, R.* Nicholson J. 35 (1813) 81-.
- — —. *Cayley, G.* Nicholson J. 35 (1813) 167-.
- crystallisation. *Marx, C. M.* Schweigger J. 54 (= Jb. 24) (1828) 426-.
- , and formation of bubbles in. *Barthélemy, A.* C. R. 67 (1868) 798-.
- density. *Nichols, E. L.* Ps. Rv. 8 (1899) 21-.
- effect of pressure. *Wood, R. W.* (jun.) Am. J. Sc. 41 (1891) 30-.
- expansion, bursting of hollow vessels by. *Chancel, G., & Martins, C.* [1869-70] Mntp. Mm. Ac. Sect. Sc. 7 (1867-71) 407-; C. R. 70 (1870) 1149-, 1251-.
- filaments. *Meldola, R.* Nt. 21 (1880) 302.
- —. *Schwalbe, B.* Berl. Ps. Gs. Vh. (1885) 26-.
- formation. *Birkholz, D. A. M.* Schweigger J. 12 (1814) 400-.
- —. *Boué, A.* Wien SB. 44 (1861) 203-.
- —. *Berger, J.* (xn) Frkf. a. M. Ps. Vr. Jbr. (1867-68) 30-.
- —. *Backhouse, T. W.* Nt. 39 (1889) 437.
- —. *Karsten, G.* [1893] Schl.-Holst. Nt. Vr. Schr. 10 (1895) 64-.

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- , artificial. *Abt, A.* (xn) Kolozsvár Orv.-Term. Társ. Éts. [1] (1876) (Term. Estél.) [11]-.
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- still water. *Silliman, B.* Silliman J. 3 (1821) 179-.
- and thawing, relation to temperature. *Brünnings, C. L.* Amst. Vh. 2 (1816) 27-, 33-.
- , theory (Arctic Ocean). *Stefan, J.* Wien Ak. Sb. 98 (1890) (Ab. 2a) 965-.
- ground-. *Pictet, M. A.* Bb. Un. 7 (1818) 304-.
- —. *Eisdale, —.* Edinb. N. Ph. J. 17 (1834) 167-.
- —. *Aycke, J. C.* Pogg. A. 39 (1836) 122-.
- —. *Adie, Rich.* Edinb. N. Ph. J. 42 (1847) 243-.
- —. *Schwabe, H.* Anhalt Vh. Nt. Vr. 6 (1847) 7-.
- —. *Dewey, C.* Silliman J. 10 (1850) 277-.
- —. *Adie, Rich.* C. S. J. 15 (1862) 88-.
- —. *Keefe, T. C.* Cn. J. 7 (1862) 173-.
- —. *Macdougall, A.* Nt. 21 (1880) 612.
- —. *Barnes, H. T.* Cn. R. S. P. & T. 5 (1899) (Sect. 3) 17-.
- , formation. *Dulk, F. P.* Froriep Not. 49 (1836) 341-.
- —. *Mohr, C. F.* Pogg. A. 43 (1838) 527-.
- —. *Engelhardt, F.* Mulhouse Bil. S. In. 16 (1842) 63-.
- —. *Maschke, O.* Pogg. A. 95 (1855) 226-.
- —. *Engelhardt, F.* C. R. 51 (1860) 23-.
- —, in fresh and salt water. *Edlund, E.* Stockh. Öfv. 19 (1862) 367-.
- —, rivers. *McKeever, T.* Thomson A. Ph. 3 (1822) 187-.
- — —. *Merian, P.* Meisner A. 2 (1824) 58-.
- — —. *Raucourt, —.* J. Gén. Civ. 8 (1830) 248-.
- — —. *Arago, D. F. J.* Par. Bur. Long. An. (1833) 244-.
- — —. *Farquharson, J.* Phil. Trans. (1835) 329-; (1841) 37-.
- — —. *Adie, Rich.* Ph. Mg. 5 (1853) 340-; C. S. J. 14 (1862) 111-.
- interior melting. *Thomson, (Sir) W.* [1858] R. S. P. 9 (1857-59) 141-.
- irregular fusibility. *Faraday, M.* Phil. Trans. (1858) 228-.
- land-, Greenland, motion. *Drygalski, E. von.* Berl. Ps. Gs. Vh. (1898) 62-.
- , thawing. *Schigtz, O. E.* N. Ts. Fs. K. 1 (1896) 241-.
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- machines, and ice-making. *Hartley, W. N.* Pop. Sc. Rv. 16 (1877) 270-.

- manufacture. *Fischer, F.* Dingler 224 (1877) 165-.
- melting, cause of holes in sheets. *Ferguson, J.* Ph. Mg. 15 (1839) 305-.
- in contact with gases. *Prytz, K. Kjob.* Ov. (1893) 151-, 274.
- near melting point. *Forbes, J. D.* C. R. 47 (1858) 367-.
- melting point curve. *Tammann, G.* [1899] Dorpat Sb. 12 (1901) 295-.
- and softening. *Meidinger, —.* [1885] Karlsruhe Nt. Vr. Vh. 10 (1888) (Sb.) 64-, 66.
- peculiar. *Clere, J. F. A.* Mines 7 (1822) 15-.
- properties. *Helmholtz, H.* Heidl. Vh. Nt. Md. 3 (1865) 194-.
- river-, floating power. *Kingsmill, T. W.* Nt. 36 (1887) 581.
- , thickness, etc. *Brünings, C. L.* Amst. Vh. 2 (1816) 189-.
- sea water, formation. *Edlund, E.* Stockh. Öfv. 20 (1863) 349-; 22 (1865) 207-.
- , —, — and dissipation. *Ashe, W. A.* Science 10 (1887) 95-.
- , —, —. *Boas, F.* Science 10 (1887) 118-.
- of skating-rink. *Ritter, G.* Neuch. S. Sc. Bl. 12 (1880) 80-.
- as solid body. *Struve, F. G. W. von.* St. Pét. Ac. Sc. Bl. 4 (1845) 169-.
- structure. *Bigelow, A.* Silliman J. 32 (1861) 205-.
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- vesicular, stratification by pressure. *Thomson, (Sir) W.* [1858] R. S. P. 9 (1857-59) 209-.

- Iron, cast, flotation on molten. *Overzier, L.* A. Ps. C. 139 (1870) 651-.
- , —, —. *Centner, —.* Nt. 15 (1877) 529-.
- castings, why accurate copies of mould. *Mallet, R. V.* Nost. Eng. Mg. 11 (1874) 498-.
- , —, expansion and shrinkage. *West, T. D.* [1896] Am. I. Mn. E. T. 26 (1897) 165-.
- , foundry-, fusibility. *West, T. D.* Sc. Abs. 1 (1898) 253.
- and steel, properties at welding temperatures. *Wrightson, T.* [1895] Phil. Trans. (A) 186 (1896) 593-.
- Lead projectiles, supposed melting. *Vieth, G.* U. A. Gilbert A. 19 (1805) 244-.
- , solidifying, fracture of thermometer in. *Marx, C. M.* Schweigger J. 59 (=Jb. 29) (1830) 484-.
- Liquid state, conditions. *Carnelley, T.* Nt. 22 (1880) 434-.
- Melting. *Egyed, M.* (xii) Kolozsvár Orv.-Term. Társ. Ets. [1] (1876) (Term. Szak) [25]-.

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- Fleury, G.* C. R. 69 (1869) 545-.
- Müller, Joh.* Freiburg B. 6 (1873) (Heft 2) 110-.
- Moutier, J.* Par. S. Phlm. Bl. 13 (1876) 11-.
- Stuginov, N. P.* Kazan S. Nt. (Ps.-Mth.) P. 8 (1890) 347-; Fsch. Ps. (1890) (Ab. 2) 322.
- Le Chatelier, H.* C. R. 121 (1895) 323-.
- of alloys. *Ziloff, P.* J. de Ps. 8 (1889) 525-.
- aluminium-antimony alloy. *Aubel, E. van.* J. de Ps. 7 (1898) 223-.
- bodies in contact. *Lehmann, O.* A. Ps. C. 24 (1885) 1-.
- determination. *Himly, C. F. A.* [1876] A. Ps. C. 160 (1877) 102-.
- (at various pressures). *Damien, B. C. C.* R. 108 (1889) 1159-.
- *Christomanos, A. C.* Berl. B. 23 (1890) 1093-.
- *Vandevyver, L. N.* Arch. Sc. Ps. Nt. 6 (1898) 129-.
- of elements, relation to atomic weights. *Chapel, —.* C. R. 99 (1884) 338.
- , — expansion. *Freuchen, P., & Poulsen, V.* N. Ta. Fs. K. 1 (1896) 45-; C. Ztg. 20 (1896) (Rpm.) 125.
- gold and silver. *Callendar, H. L.* Ph. Mg. 33 (1892) 220-.
- , —. *Berthelot, D.* C. R. 126 (1898) 473-.
- under great pressure. *Mack, E.* C. R. 127 (1898) 361-.
- of metals, relation to atomic weight and pressure. *Sayno, A.* Mil. I. Lomb. Rd. 25 (1892) 637-.
- , — expansion. *Heen, P. de.* Brux. Ac. Bl. 41 (1876) 1019-; 4 (1882) 38.
- , —. *Lémeray, —.* C. R. 131 (1900) 1291-.
- , — latent heat. *Richards, J. W.* Franklin I. J. 143 (1897) 379-.
- mixtures. *Kastner, K. W. G.* Kastner Arch. C. 1 (1830) 101-.
- organic substances, determination. *Landolt, H.* Z. Ps. C. 4 (1889) 349-.
- refractory metals. *Violle, J.* C. R. 85 (1877) 543-; 87 (1878) 981-; 89 (1879) 702-.
- relation to expansion and pressure. *Sayno, A.* Mil. I. Lomb. Rd. 24 (1891) 574-.
- solubility. *Étard, A.* C. R. 108 (1889) 176-.
- of salts. *McCrae, J.* A. Ps. C. 55 (1895) 95-.
- variation with pressure. *Bunsen, R. W.* [1850] A. C. 35 (1852) 383-.
- , —. *Schaffgotsch, F. von.* Pogg. A. 102 (1857) 293-.
- *Battelli, A.* Ven. I. At. (1884-85) 1781-.
- *Damien, B. C.* C. R. 112 (1891) 785-.
- *Barus, C.* U. S. Gl. Sv. Bl. No. 103 (1893) 57 pp.

- variation with pressure. *Ponsot, A.* C. R. 119 (1894) 791-.
- — — *Heydweiller, A.* Bresl. Schl. Gs. Jbr. (1897) (Ab. 2a) 53.
- — — *Demerliac, R.* J. de Ps. 7 (1898) 591-.
- — —, benzene. *Demerliac, R.* C. R. 122 (1896) 1117-; 124 (1897) 75-.
- — —, ice. *Beck, L. C.* Silliman J. 45 (1843) 49-.
- — —, —. *Thomson, (Sir) W.* Ph. Mg. 37 (1850) 123-.
- — —, —. *Goossens, B. J.* Arch. Néerl. 20 (1886) 449-.
- — —, igneous rock. *Barus, C.* Am. J. Sc. 43 (1892) 56-; U. S. Gl. Sv. Bill. No. 96 (1892) 100 pp.; Ph. Mg. 35 (1893) 296-.
- — —, paraffin, etc. *Peddle, W.* Edinb. R. S. P. 13 (1886) 155-.

- Metals, electric fusion. *Bassani, C.* Rv. Sc.-Ind. 27 (1895) 1-.
- Minerals, fusibility. *Spezia, G.* Tor. Ac. Sc. At. 22 (1886-87) 419-.
- Mixtures of 2 non-metallic substances, fusion. *Battelli, A., & Martinetti, M.* Tor. Ac. Sc. At. 20 (1885) 1058-.
- Molecules, rearrangement after solidification. *Warrington, R.* (vi Add.) Ph. Mg. 20 (1842) 537-.
- Physical observations. *Kries, F.* Schweigger J. 11 (1814) 26-.
- Platinum, fusion, and congelation of mercury. *Marcet, A.* Bb. Brit. 59 (1815) 274-.
- Regelation. *Faraday, M.* R. S. P. 10 (1859-60) 440-.
- — — *Brayley, E. W.* R. S. P. 10 (1859-60) 450-.
- — — (Faraday's experiments). *Thomson, (Sir) W.* [1861] R. S. P. 11 (1860-62) 198-.
- — — *Gill, J.* [1865] Ph. Mg. 31 (1866) 119-.
- — — *Helmholtz, H.* Arch. Sc. Ps. Nt. 26 (1866) 241-.
- — — *La Harpe, J. de.* [1866] Laus. Bll. S. Vd. 9 (1866-68) 85-.
- — — *Bottomley, J. T.* Nt. 5 (1872) 185.
- of ice-crystals. *Hagenbach, E.* D. Nf. Tbl. (1888) 2.
- and recrystallisation, semi-fluid condition of aggregation. *Pfaundler, L.* Wien Ak. Sb. 73 (1876) (Ab. 2) 249-.
- of snow-granules. *Tyndall, J.* Ph. Mg. 23 (1862) 312-.
- , theory. *Pfaundler, L.* Wien Ak. Sb. 59 (1869) (Ab. 2) 201-.
- — — *Le Chatelier, H.* C. R. 114 (1892) 62-.
- Sinking of foundations, congelation process. *Reichanbach, B.* B. A. Rp. (1886) 799-.
- — — shafts, congelation process. *Lebreton, F.* A. Mines 8 (1885) 111-.
- Skating and J. Thomson's thermodynamic relation. *Joly, J.* Nt. 59 (1898-99) 485-.
- Snow and ice under pressure below 32° F. *Hungerford, E.* Am. J. Sc. 23 (1882) 434-.
- , plastic. *Williams, E. H. (jun.)* Science 5 (1885) 189.
- , rapid melting round plants. *Melloni, M.* C. R. 6 (1838) 801-.

- Snowflakes, artificial production. *Dogiel, J.* [1874] St. Pét. Ac. Sc. Bll. 20 (1875) 337-.
- Solid state, limits. *Tammann, G.* Dorpat Sb. 11 (1896) 275-; A. Ps. C. 62 (1897) 280-; 66 (1898) 473-.
- — —, —. (Tammann). *Heydweiller, A. A.* Ps. C. 66 (1898) 1194-.
- — —, —. *Tammann, G.* A. Ps. C. 68 (1899) 553-; 629-; A. Ps. 2 (1900) 1-, 424; 3 (1900) 161-.
- water. *Guthrie, Fred.* [1877] R. I. P. 8 (1879) 302-.
- Solidification. *Dufour, L.* Bb. Un. Arch. 11 (1861) 22-; C. R. 52 (1861) 878-.
- of some liquids, temperature, and influence of cooling on rate of reaction. *Aleksiev, P. P.* [1885] Kiev S. Nt. Mm. 8 (1) (1886) li-.
- — — certain organic substances. *Bruner, L.* C. R. 120 (1895) 914-.
- by pressure. *Hennessy, H.* B. A. Rp. (1857) (pt. 2) 25.
- — — *Amagat, E. H.* C. R. 105 (1887) 165-.
- produced by heat. *Schweigger, J. G. C.* Kastner Arch. Ntl. 5 (1825) 112-.
- Statical change from solid to liquid, liquid crystals. *Huilett, G. A.* Z. Ps. C. 28 (1899) 629-.
- Steel, mild, fusion in interior of ingot. *Carulla, F. J. R.* I. & S. I. J. (1891) (No. 2) 67-.
- Trituration of 2 solids, singular production of cold by. *Orioli, F.* (viii) Bologna Opusc. Sc. N. Col. (1824) 104.

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- Erman, A.* Pogg. A. 9 (1827) 557-.
- Marz, C. M.* Schweigger J. 60 (=Jb. 30) (1830) 1-, 127-; Erdm. J. Pr. C. 23 (1841) 135-.
- Bischof, G.* Leonhard u. Bronn N. Jb. (1843) 1-.
- Billet, F.* L'I. 23 (1855) 292.
- Kopp, H.* Lieb. A. 93 (1855) 129-; A. C. 47 (1856) 291-.
- (alleged expansion.) *Mallet, R.* R. S. P. 22 (1874) 366-; 23 (1875) 209-.
- Muirhead, H.* Glasg. Ph. S. P. 12 (1880) 121-.
- Love, J. B. A.* Rp. (1881) 564-.
- Schiff, R.* Rm. R. Ac. Linc. Mm. 18 (1883) 587-.
- Battelli, A., & Palazzo, L.* Rm. R. Ac. Linc. Mm. 1 (1885) 283-.

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- benzene and naphthalene. *Demerliac, R.* As. Fr. C. R. (1895) (Pt. 2) 431-.
- elements. *Toepler, M.* A. Ps. C. 53 (1894) 343-.
- formic and acetic acids. *Pettersson, O.* Stookh. Ötv. 36 (1879) No. 3, 53-.
- granite and allied rocks. *Reid, J.* [1885] Edinb. Gl. S. T. 5 (1888) 199-.

1840 Saturated Vapours

- igneous rock. *Barus, C.* Ph. Mg. 35 (1893) 173-.
- iron. *Wrightson, T. B. A.* Rp. (1879) 506-.
- , *Howe, H. M.* [1885] Am. I. Mn. E. T. 14 (1886) 400-.
- , cast. *Musket, D.* Tilloch Ph. Mg. 18 (1804) 1-.
- , —, *Anderson, R., & Hannay, J. B.* [1879] Edinb. R. S. P. 10 (1880) 359-.
- mercury. *Erman, A.* Erman Arch. Rs. 1 (1841) 321-.
- metals. *Whitley, J., & Muirhead, H.* [1878] Glasg. Ph. S. P. 11 (1879) 145-.
- , *Nies, F., & Winkelmann, A.* [1880-83] Münch. Ak. Sb. 11 (1881) 63-; A. Ps. C. 18 (1883) 364-.
- , *Vicentini, G.* [1886] Tor. Ac. Sc. At. 22 (1886-87) 28-.
- , *Vicentini, G., & Omodei, D.* Tor. Ac. Sc. At. 22 (1886-87) 712-.
- and alloys. *Wiedemann, E. E. G.* A. Ps. C. 20 (1883) 228-.
- organic compounds. *Heydweiller, A. A.* Ps. C. 61 (1897) 527-.
- rocks and minerals. *Joly, J.* [1897] Dubl. S. Sc. T. 6 (1898) 283-.
- rubidium. *Eckardt, M. A.* Ps. 1 (1900) 790-.
- thallium. *Pacher, G.* N. Cim. 2 (1895) 143-.
- water. *Dickson, S.* Tilloch Ph. Mg. 7 (1800) 69-.
- , *Renner, C. F.* Crell C. A. 2 (1803) 354-.
- , *Bellani, A.* Brugnattelli G. 1 (1808) 305-; 410-.
- , *Duvernoy, G.* Pogg. A. 117 (1862) 454-.

1840 Saturated Vapours. Pressure; Boiling-Points. Evaporation.

(See also Chemistry 7210;
Meteorology 1050.)

- Adiabatic atmosphere, heat required for conversion to existing state. *U. S. Weather Bureau.* U. S. Weath. Bur. Rp. (1898-99) (2) 750-.
- Aeolipile, date. *Folgheraiter, G.* Rm. R. Ac. Linc. Rd. 5 (1896) (Sem. 1) 392-.
- Air pump, conversion of water into ice by. *Grotthus, T. von.* Schweigger J. 29 (1820) 75-.
- , drying and freezing. *Nairne, E.* Edinb. Ph. J. 3 (1820) 56-.

BOILING-POINTS.

- Fleury, G.* J. Phm. 10 (1869) 244-.
- Le Chatelier, H.* C. R. 121 (1895) 323-.
- and critical temperature. *Bartoli, A.* N. Cim. 16 (1884) 74-; 20 (1886) 139-.
- curves a function of chemical nature of bodies. *Wildermann, M.* Berl. B. 23 (1890) 1254-; 1468-; 2146-.
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- , —, phenomena. *Aitken, J.* R. S. P. 51 (1892) 408-.
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- Belli, G. Brescia Cm. (1833) 55-.
 Moser, J. Berl. Ak. Mb. (1878) 868-.
 Naumann, A. Berl. B. 11 (1878) 33-.
 Moutier, J. Par. S. Phlm. Bil. 4 (1880) 86-.
 Lehmann, O. [1881] (xii) Z. Instk. 2 (1882) 77-.
 Ramsay, W., & Young, S. C. S. J. 47 (1885) 42-.
 Kahlbaum, G. W. A. Basel Vh. 9 (1893) 573-; D. Nf. Vh. (1894) (Th. 2, Hälfte 1) 75-; Z. Ps. C. 13 (1894) 14-; 26 (1898) 577-.
 Kelvin, (Lord). Nt. 55 (1896-97) 295-.
 Gahl, R. Z. Ps. C. 33 (1900) 178-.
 accuracy of balance method. Müller-Erbach, W. A. Ps. C. 25 (1885) 357-.
 acoustic method. Doppler, C. Wien SB. (1849) (Ab. 2) 156-.
 dynamic. Tammann, G. A. Ps. C. 33 (1888) 322-.
 — and static. Kahlbaum, G. W. A. Berl. B. 18 (1885) 3146-.
 — — — (Kahlbaum). Ramsay, W., & Young, S. Berl. B. 19 (1886) 69-.
 — — — Kahlbaum, G. W. A. Arch. Sc. Ps. Nt. 24 (1890) 351-.
 graphical method. Rankine, W. J. M. Civing. 12 (1866) 223-.
 by manometer. Kelvin, (Lord). Edinb. R. S. P. 21 (1897) 429-.
 microscopical, in very small vessels. Lehmann, O. Z. Kr. 12 (1887) 406-.
 by rate of evaporation. Müller-Erbach, W. A. Ps. C. 31 (1887) 1040-.
 — — — (Müller-Erbach). Schulze, R. A. Ps. C. 32 (1887) 329-.
 — — — Müller-Erbach, W. A. Ps. C. 34 (1888) 1047-; D. Nf. Vh. (1890) (Th. 2) 18-; Z. Instk. 10 (1890) 88-.
 relation to internal friction. Heen, P. de. Brux. Ac. Bil. 10 (1885) 251-.
 — — strength of electric field. Sokolov, A. P. Rs. Ps.-C. S. J. 26 (Ps.) (1894) 311-; Fschr. Ps. (1894) (Ab. 2) 330.
 over solids and liquids. Fischer, W. A. Ps. C. 28 (1886) 400-.
 of solids and liquids, transition between. Ramsay, W., & Young, S. L. Ps. S. P. 8 (1887) 119-; Ph. Mg. 23 (1887) 61-, 138.
 — substance in solid and liquid states. Ponsot, A. C. R. 119 (1894) 791-.
 — — — — — apparatus for showing that they are not same. Gernex, —. Par. S. Ps. Sé. (1888) 189-.
 — — — — — at same temperature. Ramsay, W., & Young, S. B. A. Rp. (1884) 622-.
 in terms of critical constants. Guye, P. A. [1892] Arch. Sc. Ps. Nt. 29 (1893) 96-.
 theoretical determination. Rudanowsky, A. P. Fschr. Ps. (1890) (Ab. 2) 244-.
 in vacuo and in gases. Regnault, V. C. R. 39 (1854) 301-, 345-, 397-.
 variation near critical point. Raveau, —. Par. S. Ps. Sé. (1893) 57-.

1840 Pressure of Vapours

- and volume. *Clausius, R. A.* Ps. C. 14 (1881) 279-, 692-; C. R. 93 (1881) 619-.
— *Lungo, C. del.* Rm. R. Ac. Linc. Rd. 7 (1891) (Sem. 1) 141-.

SPECIFIED VAPOURS.

- acetic acid. *Moutier, J.* [1880] Par. S. Phlm. Bll. 5 (1881) 31-.
amyl alcohol. *Grassi, G.* Nap. Rd. 26 (1887) 148-.
argon. *Ramsay, W., & Young, S.* [1895] Phil. Trans. (A) 186 (1896) 257-.
benzene. *Ferche, J. A.* Ps. C. 44 (1891) 265-.
carbon dioxide. *Blaserna, P.* Rm. R. Ac. Linc. Rd. 2 (1893) (Sem. 2) 365-.
chloral. *Engel, R., & Moitessier, A.* C. R. 90 (1880) 97-.
cyanogen. *Chappuis, J., & Rivière, C.* C. R. 104 (1887) 1504-; A. C. 14 (1898) 286-.
ether. *Gay-Lussac, L. J.* Gilbert A. 29 (1808) 113-.
—, table for. *Zeuner, G.* Zür. Vjschr. 8 (1863) 160-.
ice and water. *Boldrini, C.* (vi Add.) Rm. Cor. Sc. 4 (1856) 239-.
mercury. *Avogadro, A.* [1831] Tor. Mm. Ac. 36 (1833) 215-.
— *Benedix, A.* Pogg. A. 92 (1854) 632-.
— *Regnault, C.* C. R. 73 (1871) 1462-.
— *Hagen, E. B.* A. Ps. C. 16 (1882) 610-.
— *Hertz, H. R.* A. Ps. C. 17 (1882) 193-.
— *Rayleigh, (Lord).* B. A. Rp. (1882) 441-.
— *McLeod, H. B. A.* Rp. (1883) 443-.
— *Ramsay, W., & Young, S.* C. S. J. 49 (1886) 37-.
— *Morley, E. W.* Am. As. P. (1890) 91-.
— (0° to 100°). *Pfaundler, L. A.* Ps. C. 63 (1897) 36-.
— *Cailletet, L., Colardeau, —, & Rivière, —.* C. R. 130 (1900) 1585-.
—, and its diffusibility. *Biot, —.* Mâcon Ac. A. 12 (1895) 108-.
—, effect on barometer. *Shortrede, R.* As. S. M. Not. 26 (1866) 307.
—, measurement by rate of evaporation. *Müller-Erbach, W.* D. Ps. Gs. Vh. (1900) 127-.
organic liquids. *Wüllner, A.* Bonn SB. Niedr. Gs. (1866) 66-.
oxygen. *Estreicher, T.* [1895] Krk. Ak. (Mt.-Prz.) Rz. 10 (1896) 140-; Ph. Mg. 40 (1895) 454-.
sulphuric acid. *Perkins, C. A.* Am. J. Sc. 40 (1890) 301-.

Water Vapour.

- Arzberger, J.* Wien Jb. Pol. I. 1 (1819) 144-.
Avogadro, A. Brugnattelli G. 2 (1819) 187-.
Cregdon, W. Tilloch Ph. Mg. 53 (1819) 266-.
August, E. F. Pogg. A. 13 (1828) 122-.
(at high temperatures.) *Arago, D. F. J., & Dulong, —.* Par. Bll. S. Encour. 29 (1830) 295-.

Water Vapour 1840

- (at high temperatures.) *Gérard, —.* Edinb. J. Sc. 3 (1830) 90-.
(— — —.) *Anon.* (vi 593) G. Arcad. 45 (1830) 1-.
(— — —.) *Dulong, P. L.* (vi Add.) Par. Mm. Ac. Sc. 11 (1832) 897-.
Egen, P. N. C. Pogg. A. 27 (1833) 9-.
Biot, J. B. C. R. 12 (1841) 150-.
(-6°-6 to 104°-6 C.) *Magnus, G.* Berl. B. (1843) 282-.
Apjohn, Jas. Ir. Ac. P. 2 (1844) 104-.
Magnus, G. Pogg. A. 61 (1844) 225-.
Majocchi, G. A. (vi Add.) Majocchi A. Fis. C. 16 (1844) 225-.
Regnault, V. A. C. 11 (1844) 273-; C. R. 18 (1844) 537-.
(at low temperatures.) *Muncke, G. W.* Pogg. A. 67 (1846) 376-.
(about zero.) *Kirchhoff, G.* Pogg. A. 103 (1858) 206-.
(at zero.) *Moutier, J.* Par. S. Phlm. Bll. 12 (1875) 38-.
Broch, O. J. Par. Poids et Mes. Tr. Mm. 1 (*1881) A. 17-.
(up to 200 atmospheres.) *Antoine, C.* C. R. 113 (1891) 328-.
Hinrichs, G. Z. Ps. C. 8 (1891) 680-.
(-50° to +20° C.) *Juhlin, J.* [1891] Stookh. Ak. Hndl. Bh. 17 (Afd. 1) (1892) No. 1, 72 pp.; Ftschr. Ps. (1891) (Ab. 2) 351-.
Antoine, —. C. R. 116 (1893) 870-.
(82° to 100°.) *Wiebe, H. F.* Z. Instk. 13 (1893) 329-.
(below zero.) *Thiesen, M.* A. Ps. C. 67 (1899) 690-.
(-12° to +25°.) *Thiesen, M., & Scheel, K.* Berl. Ps. Reichsanst. Ab. 3 (1900) 71-.
in presence of hygroscopic substances. *Müller-Erbach, W.* Carl Rpm. 17 (1881) 652-.
Regnault's experiment, temperature determinations in. *Bosscha, J.* Amst. Vs. Ak. 5 (1871) (Ntk.) 332-; Arch. Néerl. 7 (1872) 117-.
—, uncertainty below 100°. *Wild, H.* [1893] St. Pét. Ac. Sc. Bll. 36 (1894) 1-.
—, table, corrections. *Moritz, A.* [1854-69] St. Pét. Ac. Sc. Bll. 13 (1855) 41-; 14 (1870) 80-.
table for. *Zeuner, G.* Sch. Pol. Z. 8 (1863) 1-.
— *Fliegner, A.* Civing. 20 (1874) 441-.
— each $\frac{1}{100}^{\circ}$ from 93° to 101° C. *Crahay, J. G.* Brux. Ac. Bll. 15 (1848) (pte. 2) 363-.

PRESSURE TEMPERATURE RELATION FOR SATURATED VAPOURS.

- Tregaskis, R.* Edinb. J. Sc. 10 (1829) 72-.
Bary, E. C. R. 20 (1845) 1574-.
Russell, J. S. Edinb. R. S. P. 1 (1845) 227-.
[Shortrede non] *Shortreed, R.* R. S. P. 5 (1848) 738-.
Waterson, J. J. B. A. Rp. (1853) (pt. 2) 11-.
Rankine, W. J. M. Ph. Mg. 8 (1854) 530-.
Coste, L. M. P. C. R. 43 (1856) 90-.
Groshans, J. A. Pogg. A. 104 (1858) 651-.
Buff, H. Lieb. A. 2 (1863) (Suppl. Bd.) 137-.
Nikolai, L. (xii) Kazan Un. Mm. 4 (1868) 497-.

- Herrmann, E. Wien Sb. 64 (1871) (Ab. 2) 623-.
- Massieu, F. C. R. 75 (1872) 872-.
- St. Loup, L. A. C. 27 (1872) 211-.
- Winkelmann, A. A. Münch. Ak. Sb. 9 (1879) 371-; A. Ps. C. 9 (1880) 208-, 358-.
- Pictet, R. C. R. 90 (1880) 1070-.
- Heen, P. de. Brux. Ac. Bll. 11 (1886) 165 (bis)-.
- Koláček, F. A. Ps. C. 29 (1886) 347-.
- Unwin, W. C. L. Ps. S. P. 8 (1887) 22-; Ph. Mg. 21 (1886) 299-.
- Antoine, C. C. R. 107 (1888) 681-, 778-, 836-.
- Bartoli, A., & Stracciati, E. [1889] Catania Ac. Gioen. At. 2 (1890) 1-.
- Saloff, N. de. C. R. 109 (1889) 663-.
- Heen, P. de. Brux. Ac. Bll. 19 (1890) 394-.
- Laar, J. J. van. Z. Ps. C. 11 (1893) 433-.
- Kraevič, K. D. Ph. Mg. 37 (1894) 35-.
- (Kraevič.) FitzGerald, G. F. Ph. Mg. 37 (1894) 89.
- Donnan, F. G. Nt. 52 (1895) 619.
- Bakker, G. [1895] Nt. 53 (1895-96) 79.
- Bogaevskij, L. Rs. Ps.-C. S. J. 29 (Ps.) (1897) 87-; Fsch. Ps. (1897) (Ab. 2) 176.
- Schlemüller, W. Wien Ak. Sb. 106 (1897) (Ab. 2a) 9-.
- Moulin, [H.] Par. S. Ps. Sé. (1900) 160-.
- Biot's law, and law of corresponding boiling points. Mewes, R. Dingler 315 (1900) 424-.
- Dalton's law. Laval, E. Bordeaux S. Sc. Mm. 5 (1883) 107-.
- , modification. Heen, P. de. Brux. Ac. Bll. 9 (1885) 281-.
- Determination of $\frac{dp}{dt}$. Perot, A. C. R. 104 (1887) 1366-.
- Deviation from laws of elastic fluids. Waterston, J. J. Ph. Mg. 14 (1857) 279-.
- Dupré and Rankine's formula. Juliusburger, P. A. Ps. 3 (1900) 618-.
- Esters. Nadeždin, A. Exner Rpm. 23 (1887) 759-.
- Regnault's law. Dupré, A. C. R. 58 (1864) 806-.
- Water Vapour.*
- Dalton, J. [1801] Manch. Ph. S. Mm. 5 (1802) 535-.
- (Dalton's experiments.) Soldner, J. Gilbert A. 17 (1804) 44-; 25 (1807) 411-.
- Roche, —. QJ. Sc. 2 (1829) 168-.
- Biot, J. B. L'I. 1 (1833) 223-.
- (Dulong's formula.) Spassky, M. Pogg. A. 30 (1833) 331-.
- Farey, J. CE I. T. 1 (1836) 85-.
- Webster, T. CE I. T. 1 (1836) 219-.
- Mossotti, O. F. Mod. S. It. Mm. 21 (1837) 335-.
- Wrede, F. J. Sk. Nf. F. 2 (1840) 242-; Pogg. A. 53 (1841) 225-.
- Strehke, F. Pogg. A. 58 (1843) 334-.
- Holtzmann, C. H. A. Pogg. A. 67 (1846) 382-.
- Alexander, J. H. Silliman J. 6 (1848) 210-, 317-.
- Rankine, W. J. M. Edinb. N. Ph. J. 47 (1849) 28-.
- Curr, J. R. S. P. 5 (1850) 941-, 960.
- Kessler, F. Danzig Schr. 6 (Heft 4) (1862) 34 pp.
- (Alexander's formula.) Potter, R. Ph. Mg. 29 (1865) 98-.
- Edmonds, T. R. Ph. Mg. 29 (1865) 169-.
- Cazin, A., & Hirn, G. A. (ix) Par. S. Phlm. Bll. 4 (1867) 19-.
- Duperray, J. G. C. R. 72 (1871) 723-.
- Morton, A. (x) Glasg. I. Eng. T. 14 (1871) 203-.
- Bertrand, J. C. R. 105 (1887) 389-.
- Kraevič, K. D. Rs. Ps.-C. S. J. 20 (Ps.) (1888) 39.
- Colard, O. Rv. Un. Mines 27 (1894) 106.
- Manaira, A. N. Cim. 1 (1895) 365-.
- Tumirz, O. Wien Ak. Sb. 105 (1896) (Ab. 2a) 1059-.
- Gnusin, D. Mosc. S. Sc. Bll. 96 (No. 1) (1899) 10-; Fsch. Ps. (1899) (Ab. 2) 376-.
- Pumping hot water. Coles, H. J. I. CE. P. 75 (1884) 211-.
- Saturation, theory of law. Planck, M. A. Ps. C. 13 (1881) 535-.

SPHEROIDAL STATE.

- Klaproth, M. H. Scherer J. C. 7 (1801) 646-.
- Döbereiner, J. W. A. Gén. Sc. Ps. 4 (1820) 263; Schweigger J. 29 (1820) 43-.
- Muncke, G. W. Pogg. A. 13 (1828) 235-.
- Fischer, N. W. Pogg. A. 19 (1830) 514-; 21 (1831) 163-.
- Muncke, G. W. Pogg. A. 22 (1831) 208-.
- Buff, H. Pogg. A. 25 (1832) 591-.
- Baudrimont, A. A. C. 61 (1836) 319-; C. R. 1 (1836) 290-.
- Laurent, A. C. R. 3 (1836) 149-; A. C. 62 (1836) 327-.
- Boutigny, P. H. Eure Rec. S. Ag. 10 (1839) 362-; C. R. 10 (1840) 397-.
- Desmarest, J. L. J. Phm. 26 (1840) 746-.
- Emsmann, H. Pogg. A. 2 (1840) 444-.
- Boutigny, P. H. Eure Rec. S. Ag. 1 (1841) 167-.
- Marchand, R. F. Erdm. J. Pr. C. 23 (1841) 137-.
- Person, C. C. C. R. 15 (1842) 492-.
- Boutigny, P. H. A. C. 9 (1843) 350-; 11 (1844) 16-.
- (Boutigny.) Belli, G. Mil. I. Lomb. G. 5 (1843) 162-.
- (Matter, fourth state, Boutigny's work.) Bresson, —. (vii) Rouen Bll. S. Ém. (1843) 116-.
- Cima, A. Pisa Misc. Md. Chir. (1843) (pte. 2) 248-.
- Belli, G. Mil. I. Lomb. G. 5 (1844) 399-.
- Fusini, A. A. Sc. Lomb. Ven. 13 (1844) 205-.
- Armstrong, W. G. Ph. Mg. 27 (1845) 257-.
- (Boutigny.) Bellant, A. (vi Add.) Majocchi A. Fis. C. 20 (1845) 49-.
- Kersting, R. [1845] (viii) Riga Cor.-Bl. 1 (1846) 147-.

1840 Spheroidal State

- Moritz, A. Pogg. A. 72 (1847) 112.
 Boutan, A. Rouen Tr. Ac. (1848) 32.
 Légal, J. C. R. 30 (1850) 182-, 451-.
 Boutigny, P. H. C. R. 31 (1850) 279-.
 Laroque, F. Toul. Mm. Ac. 6 (1850) 147-.
 Palmstedt, C. Stockh. Öfv. 7 (1850) 281-.
 Person, C. C. R. 31 (1850) 899-.
 Schnauss, J. Pogg. A. 79 (1850) 432-.
 Zantedeschi, F. Zantedeschi A. Fis. (1849-50) 37-.
 (Boutigny.) Buff, H. Lieb. A. 77 (1851) 1-.
 Kerckhoff, P. J. van. Pogg. A. 84 (1851) 136-.
 Laroque, F. Toul. Mm. Ac. 1 (1851) 167-.
 Nöschel, A. (vrm) Riga Cor.-Bl. 4 (1851) 145-, 161-.
 Poleck, T. Bresl. Schl. Gs. Übs. (1852) 27-.
 (Boutigny's.) Brame, C. L'I. 21 (1853) 281.
 Church, A. H. Ph. Mg. 7 (1854) 275-.
 Boutigny, P. H. J. Phm. 29 (1856) 355-.
 Delprat, F. A. T. [1857] Utr. Aant. Prv. Gn. (1857-58) 23-.
 Osann, G. Würzb. Vh. 9 (1859) 52-.
 Boutigny, P. H. C. R. 50 (1860) 675-.
 Meunier, S. Presse Sc. 2 (1860) 68-.
 Artur, J. F. C. R. 53 (1861) 371-.
 Boutigny, P. H. C. R. 53 (1861) 1062-.
 Luca, S. de. Pisa A. Un. Tosc. Sc. Cosm. 5 (1858-61) 141-.
 Berger, —. Pogg. A. 119 (1863) 594-.
 Demain, S. C. R. 56 (1863) 1103-.
 Nöschel, A. Riga Cor.-Bl. 15 (1866) 73-.
 Budde, E. [1869] Bonn SB. Niedr. Gs. 26 (1869) 35-; A. Ps. C. 142 (1871) 158-.
 Colley, R. A. Ps. C. 143 (1871) 125-.
 (Budde.) Berger, (Dr.) —. A. Ps. C. 147 (1872) 472-.
 (Colley.) Berger, (Dr.) —. A. Ps. C. 147 (1872) 474-.
 Barrett, W. F. [1877] Dubl. S. Sc. P. 1 (1878) 83-.
 Moss, R. J. [1877] Dubl. S. Sc. P. 1 (1878) 87-.
 Garnett, W. Nt. 17 (1878) 466.
 D'yakonov, D. I. (xii) Rs. Ps.-C. S. J. 14 (Ps.) (1882) [Pt. 1] 542-.
 Luvini, G. Tor. Ac. Sc. At. 19 (*1883) 579-.
 Gossart, É. C. R. 104 (1887) 1270-; Caen S. L. Bll. 1 (1887) 75-, 136-; 2 (1888) 97-.
 Kristensen, K. S. Ts. Ps. C. 27 (1888) 161-; Ph. Mg. 28 (1889) 220.
 Scheck, —. Kassel Vr. Nt. B. 36 & 37 (1891) 51-.
 (at 30° C.) Ehrenfeld, C. H. Science 21 (1893) 199-.
 Pflaum, H. Riga Cor.-Bl. 37 (1894) 105-.
 Maltézos, C. Athènes Obs. Nat. A. 1 (1896) 231-.
 Stark, J. A. Ps. C. 65 (1898) 306-.
 application to analysis of stains from Marsh's apparatus. Boutigny, P. H. C. R. 21 (1845) 1068-.
 in boilers. Boutigny, P. H. B. A. Rp. (1845) (pt. 2) 27-.
 —. Normandy, A. Ph. Mg. 7 (1854) 283-.
 —. Witz, A. C. R. 114 (1892) 411-.
 —. Swarte, — de. C. R. 114 (1892) 1419-.

Spheroidal State 1840

- in boilers. Witz, A. C. R. 115 (1892) 38.
 —, explosions. Campi, (conte) G. (xii) Firenze Ac. Georg. At. 24 (1846) 335-.
 —, —. Provenzali, F. S. Rm. N. Line. At. 36 (1883) 175-.
 —, prevention. Taddei, G. (xii) Firenze Ac. Georg. At. 24 (1846) 339-.
 cause of travelling motion. Stoney, G. J. B. A. Rp. (1878) 442.
 drops on heated liquid. Chomel, —. C. R. 19 (1844) 581-.
 — of melted slag floating on water. Faraday, M. Q.J. Sc. 1 (1828) 221-.
 electric investigation. Gezekhus [Hesekhus], N. A. (xii) Rs. C. Ps. S. J. 8 (Ps.) (1876) [Pt. 1] 311-, 356-; (x) A. Ps. C. Beibl. 1 (1877) 449-.
 — and other properties of bodies in. Wartmann, É. Laus. Bll. S. Vd. 2 (1846-48) 341-.
 electrification on leaving. Rijke, P. L. Pogg. A. 98 (1856) 500-.
 evaporation. Person, C. C. Rouen Tr. Ac. (1843) 115-.
 —. Riddell, J. L. Silliman J. 26 (1858) 71.
 freezing of water in red hot vessels. West, W. [1845] W. Yorks. P. Gl. S. 2 (1842-48) 285-.
 heat acquired by water in red hot vessel. Lechevalier, V. J. Phm. 16 (1830) 666-.
 laws. Boutigny, P. H. C. R. 90 (1880) 1074-.
 mathematical theory. Gossart, E. C. R. 105 (1887) 518-.
 mechanical theory. Favé, L. C. R. 84 (1877) 906-.
 momentary incombustibility of living organic tissue. Boutigny, P. H. C. R. 28 (1849) 593-; A. C. 27 (1849) 54-; C. R. 29 (1849) 471-; J. Phm. 16 (1849) 24-, 424-.
 — — — — (Boutigny). Bellani, A. Polli A. 9 (1849) 169-, 222-, 276-; Mil. G. I. Lomb. 2 (1850) 3-.
 — — — —. Boutigny, P. H. A. C. 28 (1850) 158-.
 — — — — (Bellani). Polli, G. Polli A. 10 (1850) 48-.
 — — — —; plunging hand into boiling tar. Davenport, R. Thomson A. Ph. 9 (1817) 111-.
 — — — —; — — — molten metal. Come, —. C. R. 30 (1850) 298-.
 temperature. Peltier, A. Par. S. Phm. PV. (1841) 5-.
 —. Luca, S. de. N. Cim. 11 (1860) 60-; C. R. 51 (1860) 141-.
 —. Missaghi, G. N. Cim. 11 (1860) 175-.
 —. Boutigny, P. H. J. Phm. 39 (1861) 273-.
 —. Luca, S. de. C. R. 53 (1861) 101-; N. Cim. 13 (1861) 154-; Nap. Rd. 1 (1862) 70-; C. R. 55 (1862) 245-.
 —. Bell, L. Science 4 (1884) 50.
 —. Finocchi, E. Rv. Sc.-Ind. 20 (1888) 79-.
 in vacuo. Laroque, F. Toul. Mm. Ac. 1 (1851) 395-.
 —. Luvini, J. C. R. 98 (1884) 1536-.

State of matter characterised by independence of pressure and specific volume. Heen, P. de. Brux. Ac. Bll. 24 (1892) 267-.

STEAM.

- Moutier, J.* [1876] *Par. S. Phlm. Bll.* 1 (1877) 7-.
- cloudy condensation. *Aitken, J.* *Nt.* 49 (1893-94) 340-.
- *Barus, C.* *Nt.* 49 (1893-94) 363-.
- *Bidwell, S.* *Nt.* 49 (1893-94) 388.
- condensation. *Callendar, H. L., & Nicolson, J. T. B. A. Rp.* (1897) 418-.
- in engines. *Delafond, F.* *C. R.* 100 (1885) 237-.
- *Anon.* *Elect.* 29 (1892) 593-.
- *Donkin, B. (jun.)* *Am. Eng. & Railroad J.* 67 (1893) 287.
- expansion. *Koch, L.* *Franklin I. J.* 40 (1860) 378-.
- , adiabatic. *Charpentier, P.* *C. R.* 98 (1884) 85-, 425-.
- , law. *Tate, T.* *CE. I. P.* 6 (1847) 343-.
- experiments. *Scrymgeour, J.* *Dingler* 73 (1839) 321-.
- flow, formulæ. *Parenty, H.* *C. R.* 116 (1893) 1120-.
- , and of mixture of steam and water. *Guzzi, P.* *Mil. I. Lomb. Rd.* 21 (1898) 725-.
- formation at high temperatures. *Schafhüttl [Pellissov], C. E.* *Dingler* 71 (1839) 351-; 73 (1839) 81-.
- heating of bodies by contact with. *McCausland, R.* *Philad. Md. Ps.* J. 1 (1805) 110-.
- liquids by. *Gilbert, L. W.* *Gilbert A.* 16 (1804) 503-.
- humidity, measurement. *Hirn, G. A.* *Civing.* 15 (1869) 493-.
- , *Guzzi, P.* *Franklin I. J.* 74 (1877) 355-.
- , *Knight, J. B.* *Franklin I. J.* 74 (1877) 358-.
- , apparatus. *Rateau, —.* *A. Mines* 11 (1897) 495-.
- , —, *Goodman, —.* *Nt.* 62 (1900) 610.
- jets, form, pressure and temperature. *Parenty, H.* *C. R.* 118 (1894) 183-.
- , rate of condensation. *Palmer, A. de F. (jun.)* *Am. J. Sc.* 2 (1896) 247-.
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- production in relation to heating surface. *Havrez, P.* *Cuyper Rv. Un.* 11 (1862) 39-.
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- , new. *Lowe, J.* *Franklin I. J.* 66 (1873) 250-.
- and use. *Burg, A. von. (ix)* *Wien Vr. Nw. Kennt. Schr.* 12 (1872) 279-.
- Regnault's experiments, rationalisation. *Gray, J. Macfarlane.* *I. ME. P.* (1889) 399-.
- relation between density and pressure. *Ciccone, L. (xii)* *Rv. Sc.-Ind.* 13 (1881) 170-.
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- , mechanical properties. *Antoine, C. C. R.* 80 (1875) 435-.
- scalding effect at 100°. *Kaeuffer, P.* *A. Gén. Civ.* 6 (1867) 273-.
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- volume and pressure. *Pambour, F. M. G. de.* *C. R.* 6 (1838) 373-.
- — — (Pambour). *Biot, J. B.* *C. R.* 6 (1838) 389-, 509.
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- Temperature produced by vapour, and temperature of vapour. *Faraday, M.* *A. C.* 20 (1822) 320-.
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- over fatty oil. *Hildebrandt, G. F.* *Schweigger J.* 1 (1811) 41-.
- — water. *Hildebrandt, G. F.* *Gehlen* J. 9 (1810) 541-.

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- Rankine, W. J. M.* [1865] *Edinb. R. S. P.* 5 (1866) 449-.
- adiabatic relation. *Resal, H.* *C. R.* 75 (1872) 1475.
- behaviour. *Puschl, K.* [1874-91] *Wien Ak. Sb.* 70 (1875) (*Ab.* 2) 571-; 100 (1891) (*Ab.* 2a) 843-.
- calorimetric study. *Mathias, E.* *Toul. Fac. Sc. A.* 10 (1896) E, 52 pp.
- expansion. *Tregaskis, R.* *Edinb. J. Sc.* 10 (1829) 68-.
- *Clausius, R.* *Pogg. A.* 82 (1851) 263-.
- *Cazin, A.* *C. R.* 62 (1866) 56-.
- *Rankine, W. J. M.* *Ph. Mg.* 31 (1866) 197-.
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- — —, *Cazin, A.* *C. R.* 66 (1868) 1152-; *A. C.* 14 (1868) 374-.
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- , *Dauriac*, M. N. A. Mth. 3 (1844) 127-.
- , *Zeuner*, G. *Pogg.* A. 110 (1860) 371-.
- thermal properties. *Mathias*, E. C. R. 126 (1898) 1095-; *Toul. Fac. Sc. A.* 12 (1898) E, 17 pp.
- , alcohol. *Battelli*, A. [1893] *Tor. Ac. Sc. Mm.* 44 (1894) 57-.
- , carbon disulphide. *Battelli*, A. *Tor. Ac. Sc. Mm.* 42 (1892) 119-.
- , — and water. *Battelli*, A. *Tor. Ac. Sc. Mm.* 41 (1891) 25-.
- , ether. *Ramsay*, W., & *Young*, S. [1886] *Phil. Trans. (A)* 178 (1888) 57-.
- , —. *Battelli*, A. *Tor. Ac. Sc. Mm.* 40 (1890) 21-.
- , methyl alcohol. *Ramsay*, W., & *Young*, S. [1887] *Phil. Trans. (A)* 178 (1888) 313-.
- , propyl alcohol. *Ramsay*, W., & *Young*, S. [1888-89] *Phil. Trans. (A)* 180 (1890) 137-.
- , water vapour. *Battelli*, A. [1892] *Tor. Ac. Sc. Mm.* 43 (1893) 63-.
- vesicular nature. *Lenglet*, L. C. R. 48 (1859) 1048-.
- , experiment relating to. *Plateau*, J. A. F. *Brux. Ac. Bil.* 32 (1871) 251-.
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- Volatile compound liquids, properties and use in refrigeration. *Pictet*, R. [1885] *Laus. S. Vd. Bil.* 21 (1886) xix.
- Water, boiling and distillation, influence of draught of air. *Hovitz*, F. G. *Schweigger J.* 41 (= *Jb.* 11) (1824) 293-.
- , state in atmosphere. *Gough*, J. [1803] *Manch. Ph. S. Mm.* 1 (1805) 296-.
- from steam, measurement. *Ferraris*, G. *Tor. Ac. Sc. At.* 17 (1881) 135-.
- and steam, properties. *Ramsay*, W., & *Young*, S. [1891] *Phil. Trans. (A)* 183 (1893) 107-.

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- Hervig*, H. *Bonn. SB. Niedr. Gs.* (1869) 172-.
- Antoine*, C. C. R. 107 (1888) 1143-.
- Apparent and real vapour densities of compounds. *Wanklyn*, J. A., & *Robinson*, J. (viii) *Ph. Mg.* 26 (1863) 545-.
- Calculation, tables for. *Brown*, J. T. C. S. J. 4 (1866) 72-; 8 (1870) 323-.

- Densities of liquefied gases and saturated vapours. *Cailletet*, L., & *Mathias*, —. C. R. 102 (1886) 1202-; *Par. S. Ps. Sé.* (1886) 171-.
- liquids and their saturated vapours at point of transition. *Waterston*, J. J. B. A. Rp. (1853) (pt. 2) 11.
- General law. *Waterston*, J. J. [1851] *Phil. Trans.* (1852) 83-.
- Gradient of density. *Waterston*, J. J. B. A. Rp. (1852) (pt. 2) 2.

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- Croullebois*, M. C. R. 78 (1874) 496-.
- (*Croullebois*.) *Sainte-Claire Deville*, É. H. C. R. 78 (1874) 534-.
- (*Sainte-Claire Deville*.) *Croullebois*, M. C. R. 78 (1874) 805-.
- Nilson*, L. F., & *Pettersson*, O. *Stockh. Ak. Hndl. Bh.* 11 (1887) No. 6, 16 pp.
- Agamemnone*, G. *Rm. R. Ac. Linc. Rd.* 5 (1889) (*Sem.* 1) 30-.
- Golicyn*, B. B. *Mosc. S. Sc. Bil.* 73 (No. 2) (1891) 5-; *Fschr. Mth.* (1891) 1188-; A. Ps. C. 47 (1892) 466-.
- Bauer*, G. A. Ps. C. 55 (1895) 184-.
- in barometric vacuum. *Hofmann*, A. W. D. C. Gs. B. 1 (1868) 198-.
- , —, *Hofmann's method*. *Gabba*, L. *Mil. I. Lomb. Rd.* 2 (1869) 50-.
- , —. *Tilden*, W. A. C. N. 37 (1878) 219.
- , —. *Bell*, C. A., & *Teed*, F. L. C. S. J. 37 (1880) 576-.
- near critical point. *Heen*, P. de. *Brux. Ac. Bil.* 31 (1896) 147-.
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- by level-manometer. *Toepler*, M. A. Ps. C. 57 (1896) 811-.
- liquefied gases and their saturated vapours. *Amagat*, É. H. C. R. 114 (1892) 1093-, 1322-.
- liquids and saturated vapours. *Hirsch*, R. (*Frhr.*) von. A. Ps. C. 69 (1899) 456-, 837.
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- under reduced pressure. *Schall*, C. *Berl. B.* 22 (1889) 140-; 23 (1890) 919-; 25 (1892) 1489-; *J. Pr. C.* 45 (1892) 134-; 62 (1900) 536-.
- and velocity of sound. *Jaeger*, W. A. Ps. C. 36 (1889) 165-.

- Solvents, density, in relation to solidifying and boiling points. *Raoult*, F. M. C. R. 117 (1893) 833-.
- Specific volume of liquids and vapours. *Gros-hans*, J. A. A. Ps. C. 61 (1897) 780-.
- and pressure of saturated vapours. *Lungo*, C. del. A. Ps. C. 42 (1891) 344-.
- , —, —. *Moulin*, H. C. R. 130 (1900) 1454-.
- of saturated vapours, measurements. *Perot*, A. A. C. 13 (1888) 145-; 7 (1896) 574.
- , —, —, relation to that of their liquids and to temperature. *Jäger*, G. *Wien Ak. Sb.* 99 (1891) (*Ab.* 2a) 1028-.

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- Ammonium sulphide. *Salet, G. C. R. 86* (1878) 1080-.
- Carbon dioxide, density curves. *Amagat, E. H. C. R. 131* (1900) 91-.
- Ethyl oxide. *Ramsay, W., & Young, S.* [1886] *Phil. Trans. (A)* 178 (1888) 57-.
- Methyl alcohol. *Ramsay, W., & Young, S.* [1887] *Phil. Trans. (A)* 178 (1888) 313-.
- Propyl alcohol. *Ramsay, W., & Young, S.* [1888-89] *Phil. Trans. (A)* 180 (1890) 137-.
- Steam, density, latent heat and elasticity. *Southern, J.* [1814] *Ph. Mg.* 30 (1847) 113-.
- , influence of hygroscopic character of glass on determination of density. *Grimaldi, G., & Macaluso, D. Rm. R. Ac. Linc. T. 6* (1882) 264-.
- , saturated. *Edmonds, T. R. Ph. Mg.* 30 (1865) 1-.
- , —. *Hill, J. W. V. Nost. Eng. Mg.* 18 (1878) 558-.
- , —, calculation of density. *Clausius, R. A. Ps. C. 124* (1865) 345-.
- , — at 0° C., specific volume. *Dieterici, C. Berl. Ps. Gs. Vh.* (1889) 46-; *A. Ps. C. 38* (1889) 1-; 676.
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- — — — — (Cailletet and Mathias).
- Bertrand, —. C. R. 104* (1887) 1568-.
- Water, carbon disulphide and ether, specific volumes. *Perot, A. Franklin I. J.* 133 (1892) 55-, 93-.
- and steam, some properties. *Ramsay, W., & Young, S.* [1891] *Phil. Trans. (A)* 183 (1893) 107-.

1860 Ebullition.

- Bellani, A. Brugnattelli G. 2* (1809) 413-, 501-; 3 (1810) 26-.
- Prevost, B. Bb. Un. 6* (1817) 15-.
- Dufour, C. Moigno Cosmos* 18 (1861) 650-.
- Dufour, L. Bb. Un. Arch. 12* (1861) 210-; *C. R. 52* (1861) 986-; 53 (1861) 846-.
- Pless, F. Wien Sb. 54* (1866) (Ab. 2) 75-.
- Tomlinson, C. Ph. Mg. 37* (1869) 161-.
- Gernez, D. A. C. 4* (1875) 335-.
- Tomlinson, C. Ph. Mg. 49* (1875) 432-; 50 (1875) 85-.
- Egyed, M. (xii) Kolozsvár Orv.-Term. Társ. Éts. [1]* (1876) (*Term. Szak*) [25]-.
- Grassi, G. Mil. I. Lomb. Rd. 13* (1880) 247-; *Nap. I. Inc. At. 1* (1882) No. 5, 5 pp.
- acceleration by electricity. *Cintoletti, F. (xii) Rv. Sc.-Ind. 7* (1875) 312-.
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- in capillary tubes. *Vergnano, A. (xii) Rv. Sc.-Ind. 15* (1883) 121-.
- and condensation. *Aitken, J. (of Darroch). [1875] Sc. S. Arts T. 9* (1878) 240-.

- at high temperature, relation to pressure. *Barus, C. U. S. Gt. Sv. Bil. No. 103* (1893) 57 pp.
- mechanical cause. [*Marco, F. non*] *Felice, M. Arch. Sc. Ps. Nt. 43* (1872) 279-.
- of mercury in vacuum. *Tausenot, —. A. C. 49* (1857) 91-.
- molecular vibrations and ether waves in. *Favé, L. C. R. 86* (1878) 524-.
- part played by gases in. *Gernez, D. [1873] Par. Sé. S. Ps. 1* (1873-74) 8-.
- percussive. *Pelloggio, P. Mil. I. Lomb. Rd. 4* (1867) 100-.
- of rotating liquid. *Mousson, A. A. Ps. C. 129* (1866) 168-.
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- theory. *Pechtl, J. J. Pogg. A. 35* (1835) 620-.
- in vessel contained in water bath. *Tomlinson, C. R. S. P. 37* (1884) 113-.
- of water. *Majocchi, G. A. (vt Adds.) Majocchi A. Fis. C. 1* (1841) 272-.
- —. *Dufour, L. [1864] Laus. Bil. S. Vd. 8* (1864-65) 176-, 256-.
- —. *Wittwer, —. D. Nf. B. (*1877) 119.*
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- , effects of adhesion. *Buff, H. Lieb. A. 2* (1832) 220-.
- , and explosion of boilers. *Dufour, L. C. R. 53* (1864) 1020-, 1054-; *Arch. Sc. Ps. Nt. 21* (1864) 201-.
- in narrow tubes at high temperatures. *Pfaff, I. B. A. F. Münch. Ak. Sb. 7* (1877) 216-.
- work. *Gerber, P. Ac. Nt. C. N. Acta 52* (1888) 101-.

- Boilers, evaporation in. *Brillié, H. Gén. Civ. 31* (1897) 260-, 277-, 293-.
- , marine. *Chasseloup-Laubat, L. de. Par. Ing. Civ. Mm. (1897) (Pt. 1) 437-*.
- , —, distribution of evaporation. *Stromeyer, C. E. Nv. Archt. T. 31* (1890) 145-.
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- — — — —. *Waha, M. de. Lux. I. Pb. 17* (1879) 191-.
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- for wine analysis. *Passerini, N. Firenze Ac. Georg. At. 21* (1898) 149-.
- Ebullioscopic and cryoscopic researches, Raoult's theory. *Battelli, A., & Stefanini, A. N. Cim. 9* (1899) 5-.
- Evaporation at temperatures above boiling point. *Gernez, D. C. R. 78* (1874) 1848-.
- of water from, and at 212° F. *Buel, R. H. V. Nost. Eng. Mg. 32* (1885) 106-.
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 — — — —. (Bellani). *Carradori, G.*
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 —, internal pressure and energy. *Schmidt, G.*
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 — and mixed, behaviour. *Zeuner, G. Civing.*
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 —, theory. *Weyrauch, J. J. [1876] Rpm.*
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 —, thermodynamical properties. *Grindley, J.*
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- — solid. *Gall, —.* *Par. S. Ps. Sé.* (1889) 80.
- and nitrous oxide, solidification by Natterer. *Pleischl, A.* *Erdm. J. Pr. C.* 31 (1844) 375-.
- snow. *Villard, P., & Jarry, R.* *C. R.* 120 (1895) 1413-; *Par. S. Ps. Sé.* (1895) 177-.
- — solid, production. *Ducretet, —.* *C. R.* 99 (1884) 235-.
- — — —, new apparatus for. *Cailletet, L.* *Par. S. Ps. Sé.* (1884) 268-.
- — and other volatile substances, preparation of liquid and solid. *Pleischl, A.* *Wien Z. Gs. Aerzte* 2 (1845) 194-.
- Cooling of current of gas by sudden change of pressure. *Waals, J. D. van der.* *Amst. Ak. Vs.* 8 (1900) 441-; *Amst. Ak. P.* 2 (1900) 379-.
- Cryogenic Laboratory, Leyden, methods and apparatus. *Kamerlingh Onnes, H.* *Amst. Ak. Vs.* 8 (1900) 125-, 256, 480-; *Amst. Ak. P.* 2 (1900) 129-, 437-.
- Dalton's law of pressure for mixed gases, deviation from. *Margules, M.* *Wien Ak. Sb.* 98 (1890) (*Ab. 2a*) 883-.
- Liquefaction by expansion. *Moutier, J.* [1877] *Par. S. Phlm. Bll.* 2 (1878) 48-.
- Liquefiable gases, elastic force. *Melsons, H. L. F.* *Brux. Ac. Bll.* 29 (1870) 702-.
- Liquefied gases. *Dewar, J.* [1884] *R. I. P.* 11 (1887) 148-.
- — accidents with. *Lavergne, G.* *Gén. Civ.* 28 (1895-96) 263-.
- — and dirigible balloons. *Errera, L.* [1898] *Ciel et Terre* 19 (1898-99) 229-.
- — low temperatures. *Dessau, B.* [1900] *Ps. Z.* 2 (1901) 20-, 37-, 60-.
- —, safety cylinder for. *Fournier, J. C. R.* 124 (1897) 353-.
- — — stop-cock for cylinders. *Ducretet, E., & Lefevre, L.* *C. R.* 123 (1896) 810-.
- — and their saturated vapours, densities. *Cailletet, L., & Mathias, E.* *Par. S. Ps. Sé.* (1886) 171-.
- — — —, determination. *Amagat, E. H.* *C. R.* 114 (1892) 1093-, 1322-; *Par. S. Ps. Sé.* (1892) 242.
- Liquid air. *Dewar, J.* [1896] *R. I. P.* 15 (1899) 133-.
- — *Arsonval, A. d'.* *C. R.* 126 (1898) 1683-.
- — *Tucker, S. A.* *Sch. Mines Q. N. Y.* 19 (1898) 344-.
- Liquid air. *Witkowski, A.* *Kosmos (Lw.)* 25 (1900) 568-.
- — applications. *Anon.* *Cztg. Opt.* 19 (1898) 195-.
- — *Belforti, U.* *Rv. Sc.-Ind.* 31 (1899) 65-.
- — *Linde, C.* *Ps. Z.* 1 (1900) 173-.
- — and production. *Dommer, F.* *Rv. Sc.* 11 (1899) 885-.
- — — —. *Anon.* [1899] *Sc. Abs.* 3 (1900) 107.
- — behaviour. *Wroblewski, S.* *Wien Ak. Sb.* 92 (1886) (*Ab. 2*) 639-; *Mh. C.* (1885) 621-.
- — change on evaporation. *Gruzinov, A. A.* *Rs. Ps.-C. S. J.* 32 (*Ps.*) (1900) 107-; *C. S. J.* 78 (1900) (*Abs.*, *Pt. 2*) 720.
- — preparation and properties. *Lefevre, J.* *Gén. Civ.* 33 (1898) 235-.
- — as source of power. *Abbe, C. U. S. Mly. Weath. Rv.* 27 (1899) 110-.
- — Tripler's apparatus. *Tripler, C. E.* *Sc. Abs.* 1 (1898) 484.
- — use as explosive. *Larsen, A.* [1900] *I. Mn. E. T.* 19 (1901) 164-.
- — vacuum vessels. *Dewar, J.* [1893] *R. I. P.* 14 (1896) 1-.
- hydrogen, critical and boiling point temperatures. *Olzewski, K.* *Krk. Ak. (Mt.-Prz.) Rz.* 9 (1895) 404-; *Ph. Mg.* 40 (1895) 202-.
- — preparation of high vacua by. *Dewar, J. A. C.* 17 (1899) 12-.
- nitrogen and carbon monoxide, freezing points. *Olzewski, K.* *C. R.* 100 (1885) 350-.
- Mixed gases, compression. *Cailletet, L. C.* *R.* 90 (1880) 210-.
- — liquefaction. *Cailletet, L., & Hautefeuille, P.* *C. R.* 92 (1881) 901-.
- — *Kuenen, J. P.* *Amst. Ak. Vs.* 3 (1895) 90-; *Arch. Néerl.* 1 (1898) 331-.
- — *Caubet, F.* *Bordeaux S. Sc. PV.* (1897-98) 256-; *C. R.* 130 (1900) 167-, 828-, 131 (1900) 108-, 1200-.
- — and critical phenomena (ethane and nitrous oxide). *Kuenen, J. P.* *L. Ps. S. P.* 13 (1895) 523-; *Ph. Mg.* 40 (1895) 173-.
- — — —. *Kuenen, J. P.* *L. Ps. S. P.* 15 (1897) 235-; *Ph. Mg.* 44 (1897) 174-; *Z. Ps. C.* 24 (1897) 667-.
- — — retrograde condensation. *Kuenen, J. P.* *Amst. Ak. Vs.* [1] (1893) 15-.
- — — — (Kuenen's experiments). *Kamerlingh Onnes, H., & Reinganum, M.* [1900] *Amst. Ak. Vs.* 9 (1901) 213-, 307-; *Amst. Ak. P.* 3 (1901) 289-, 374.
- Mixture of carbon dioxide and hydrogen, retrograde condensation. *Verschaffelt, J.* *Amst. Ak. Vs.* 7 (1899) 281-, 389-; *Amst. Ak. P.* 1 (1899) 288-, 323-.
- Nitrous oxide, liquefaction and solidification. *Natterer, J.* *Pogg. A.* 62 (1844) 132-.
- Oxygen, extraction from air. *Claude, G. C.* *R.* 131 (1900) 447-.
- — liquid, density. *Pictet, R.* *C. R.* 86 (1878) 37-.
- — — (probable). *Olearski, K.* [1883] (*xii*) *Krk. Ak. (Mt.-Prz.) Rz. & Sp.* 11 (1884) 188-.
- — pressure at different temperatures. *Olzewski, K.* *C. R.* 100 (1885) 350-.

1870 Specified Gases

- Physical and chemical phenomena at low temperatures. *Sluginov, N. P.* Kazan S. Ps.-Mth. Bll. 3 (1893) (Prot.) 23-.
- Seleniuretted hydrogen, physical properties at low temperature and under pressure. *Olszewski, K.* Krk. Ak. (Mt.-Prz.) Rz. 20 (1890) 282-; Crc. Ac. Sc. Bll. (1890) 57-.
- Solidification of gases. *Mareska, J.* Brux. Ac. Bll. 10 (1843) 75-.
- and nitrogen and temperature obtained by means of boiling oxygen. *Wroblewski, S. von.* C. R. 97 (1883) 1553-.

SPECIFIED GASES.

- Acetylene. *Cailletet, L.* C. R. 85 (1877) 851-.
- Air. *Koch, —.* Würtb. Jh. 55 (1899) lxxvii-.
- , *Carnelutti, —.* Rv. Sc.-Ind. 32 (1900) 31-.
- and hydrogen, liquefaction and solidification. *Hartley, W. N.* Pop. Sc. Rv. 17 (1878) 155-.
- , liquefaction by expansion. *Claude, G.* C. R. 131 (1900) 500-.
- , — Linde's method. *Ewing, J. A.* Sc. Abs. 1 (1898) 396-.
- , — and oxygen making, theory of Linde's method. *Lorenz, H.* Civing. 41 (1895) 633-.
- , — by self-intensive refrigeration. *Hampson, W.* Nt. 55 (1896-97) 485.
- , liquefied, temperature under very small pressures. *Olszewski, K.* C. R. 99 (1884) 184-.
- , separation into constituents on liquefaction. *Wroblewski, S.* C. R. 101 (1885) 635-.
- Ammonia. *Joannis, —.* [1889] Bordeaux S. Sc. Mm. 5 (1890) xxviii-.
- Argon, liquefaction and solidification. *Olszewski, K.* [1895] Phil. Trans. (A) 186 (1896) 253-.
- Carbon dioxide. *Ridolfi, C.* Brugnatelli G. 6 (1823) 455-.
- , *Thilorier, —.* L'I. 2 (1834) 197-.
- , liquefaction and solidification. *Mitchell, J. K.* Franklin I. J. 22 (1838) 289-.
- , liquid, for production of pressure. *Lehmann, O.* Z. Kr. 12 (1887) 409-.
- monoxide, liquefaction under very small pressures. *Olszewski, K.* C. R. 99 (1884) 706-.
- and oxygen. *Cailletet, L.* C. R. 85 (1877) 1213-.
- Hydrogen. *Pictet, R.* C. R. 86 (1878) 106-.
- , *Olszewski, K.* C. R. 98 (1884) 913-.
- , *Wroblewski, S.* Berl. Ak. Sb. (1884) 61.
- , *Travers, M. W.* [1900] L. Ps. S. P. 17 (1901) 561-.
- antimonide, liquefaction and solidification. *Olszewski, K.* Krk. Ak. (Mt.-Prz.) Rz. 15 (1887) 211-.
- and helium. *Dewar, J.* C. R. 126 (1898) 1408-, 1538.
- , liquefaction, possibility. *Wroblewski, S.* C. R. 98 (1884) 504-.
- , —, —. *Olszewski, K.* C. R. 98 (1884) 365-.

Continuity of State 1880

- Hydrogen, liquefaction and solidification, Pictet's experiments. *Krzyżanowski, K.* [1889] Krk. Ak. (Mt.-Prz.) Rz. 20 (1890) 1-; Crc. Ac. Sc. Bll. (1889) No. 1, xxviii-.
- , —, thermodynamic uniformity and use of vacuum vessels. *Kamerlingh Onnes, —.* Amst. Ak. Vs. 4 (1896) 236-, 271-.
- Nitrogen dioxide. *Cailletet, L.* C. R. 85 (1877) 1016-.
- and methane, liquefaction and solidification. *Olszewski, K.* C. R. 100 (1885) 940-.
- and ethylene, liquefaction under very small pressures. *Olszewski, K.* C. R. 99 (1884) 133-.
- Oxygen. *Pictet, R.* C. R. 85 (1877) 1214-, 1220-.
- and hydrogen. *Pictet, R.* Arch. Sc. Ps. Nt. 61 (1878) 16-.
- , liquefaction by ethylene. *Cailletet, L.* C. R. 100 (1885) 1033-; Par. S. Ps. Sé. (1885) 71-.
- and nitrogen. *Olszewski, K., & Wroblewski, S. von.* C. R. 96 (1883) 1140-, 1225-.
- — and carbonic oxide. *Olszewski, K., & Wroblewski, S. von.* A. Ps. C. 20 (1883) 243-.
- Ozone. *Chappuis, J., & Hautefeuille, P.* C. R. 91 (1880) 522-, 815-; 94 (1882) 1249-.
- Propylene, trimethylene and allylene. *Molčanovskij, N. V.* [1888] Kiev S. Nt. Mm. 10 (1889) xci-.

1880 Continuity of State. Critical State, Critical Point, etc. Characteristic Equations.

(See also Chemistry 7000, 7212.)

CHARACTERISTIC EQUATIONS.

- Waals, J. D. van der.* [1896] Amst. Ak. Vs. 5 (1897) 150-; Fsch. Ps. (1896) (Ab. 2) 199-.
- Berthelot, D.* Arch. Néerl. 5 (1900) 417-, 679.
- constant 'b' of van der Waals. *Guye, P. A.* Arch. Sc. Ps. Nt. 23 (1890) 197-.
- van der Waals's law, significance. *Boltzmann, —, & Mache, —.* Camb. Ph. S. T. 18 (1900) 91-.
- covolume in. *Berthelot, D.* C. R. 130 (1900) 115-.
- of gases in relation to solutions. *Jäger, G.* Wien Ak. Sb. 101 (1892) (Ab. 2a) 553-.
- internal pressure term in van der Waals's and Clausius's formulæ. *Berthelot, D.* C. R. 130 (1900) 69-.
- and law of corresponding states. *Raveau, C.* Par. S. Ps. Sé. (1896) 274-.
- new. *Amagat, E. H.* C. R. 128 (1899) 538-.
- , saturation case. *Amagat, E. H.* C. R. 128 (1899) 649-; Par. S. Ps. Sé. (1899) 51-.

1880 Continuity of State

- theories of van der Waals. *Guye, P. A.* Arch. Sc. Ps. Nt. 22 (1889) 540-.
- of van der Waals. *Kraevič, K.* Rs. Ps.-C. S. J. 19 (Ps.) (1887) 1-; *J. de Ps.* 7 (1888) 271.
- — — (isothermal). *Korteweg, D. J.* Nt. 45 (1892) 152-, 277.
- — — *Boltzmann, L.* Amst. Ak. Vs. 7 (1899) 477-; *Amst. Ak. P.* 1 (1899) 398-.
- — — (Boltzmann). *Waals, J. D. van der.* Amst. Ak. Vs. 7 (1899) 537-; *Amst. Ak. P.* 1 (1899) 468-.

CONTINUITY OF STATE.

- limit of liquid state. *Hannay, J. B.* R. S. P. 31 (1881) 520-; 33 (1882) 294-; Nt. 26 (1882) 370.
- liquid and gaseous. *Andrews, T.* Phil. Trans. 159 (1869) 575-.
- — — *Thomson, (Prof.) James.* [1871] R. S. P. 20 (1872) 1-.
- — — *Waals, J. D. van der.* [1873] (xi) A. Ps. C. Beibl. 1 (1877) 10-.
- — — *Andrews, T.* R. S. P. 23 (1875) 514-.
- — — *Bouty, E. J. de* Ps. 6 (1877) 368-.
- — — *Walter, A. D.* Nf. B. (*1877) 106-.
- — — *Hannay, J. B.* C. R. 92 (1881) 1336-.
- — — *Ramsay, W., & Young, S.* R. S. P. 42 (1887) 3-.
- — — (Clausius's formula for change). *Fitz-Gerald, G. F.* R. S. P. 42 (1887) 216-.
- — — *Nadeždin, A.* Exner Rpm. 23 (1887) 617-, 685-.
- — — (transition at all temperatures). *Ramsay, W., & Young, S.* L. Ps. S. P. 8 (1887) 194-; *Ph. Mg.* 23 (1887) 435-; *L. Ps. S. P.* 9 (1888) 33-; *Ph. Mg.* 24 (1887) 196-.
- — — *Ramsay, W., & Young, S.* Ph. Mg. 23 (1887) 547-.
- — — *Duhem, P.* Lille Tr. Mm. 1 (1889-91) Mém. 5, 105 pp.
- — — *Ramsay, W.* [1891] R. I. P. 13 (1893) 365-.
- — — *Sarrau, E.* Rv. Sc. 48 (1891) 97-.
- — —, in isothermal transformation. *Preston, T.* Dubl. S. Sc. T. 6 (1898) 119-.
- — — and solid. *Thomson, (Prof.) James.* [1871-73] B. A. Rp. 41 (1871) (Sect.) 31-; 42 (1872) (Sect.) 24-; *R. S. P.* 22 (1873-74) 27-.
- — — solid. *Barus, C.* Am. J. Sc. 42 (1891) 125-.
- — — *Heydweiller, A.* A. Ps. C. 64 (1898) 725-.

- Critical coefficient and constitution at critical point. *Guye, P. A.* Par. S. Ps. Sé. (1890) 39-.
- — — formula $\frac{n-1}{d}$. *Nasini, R.* Rm. R. Ac. Linc. Rd. 2 (1893) (Sem. 2) 127-.
- — — constant and molecular refraction, relation. *Guye, P. A.* Par. S. Ps. Sé. (1890) 17-.

Critical Constants 1880

CRITICAL CONSTANTS.

- of carbon dioxide. *Amagat, E. H.* C. R. 114 (1892) 1093-, 1322-; *Par. S. Ps. Sé.* (1892) 242.
- 2 classes of curves connecting. *Mathias, E.* C. R. 130 (1900) 1748-; *Par. S. Ps. Sé.* (1900) 165-.
- determination. *Caillaud, L., & Colardeau, E.* C. R. 112 (1891) 563-.
- *Mathias, E.* [1900] Sc. Abs. 4 (1901) 378-.
- of gases. *Leduc, A., & Sacerdote, P.* C. R. 125 (1897) 397-.
- hydrochloric acid and methyl chloride vapours. *Vincent, C., & Chappuis, J.* C. R. 100 (1885) 1216-.
- nitrogen. *Olzevski, K.* C. R. 98 (1884) 913-.
- vapours. *Vincent, C., & Chappuis, J.* C. R. 101 (1885) 427-.

- Critical data of liquids. *Heilborn, E.* Z. Ps. C. 7 (1891) 601-.
- — — and chemical constitution. *Heilborn, E.* Z. Ps. C. 6 (1890) 578-.
- — — Pennsylvanian paraffins. *Bartoli, A., & Stracciati, E.* N. Cim. 16 (1884) 104-.
- Critical density, determination. *Mathias, E.* C. R. 115 (1892) 35-.
- — — *Young, S., & Thomas, G. L.* L. Ps. S. P. 12 (1894) 134-; *Ph. Mg.* 34 (1892) 507-.
- — —, law of Caillaud and Mathias. *Young, S. L.* Ps. S. P. 17 (1901) 480-; *Ph. Mg.* 50 (1900) 291-.
- — —, supposed existence. *Heen, P. de.* Brux. Ac. Bil. 33 (1897) 119-.
- — — and theory of corresponding states. *Mathias, E.* Toul. Fac. Sc. A. 6 (1892) M, 34 pp.
- — — isothermal line and densities of saturated vapour and liquid in isopentane and carbon dioxide. *Verschaffelt, J. E.* Amst. Ak. Vs. 8 (1900) 651-; *Amst. Ak. P.* 2 (1900) 588-.
- — — phenomena. *Zambiasi, G.* Rm. R. Ac. Linc. Rd. 2 (1893) (Sem. 1) 21-.
- — —, influence of curvature in surface at high temperatures. *Waals, J. D. van der.* Amst. Ak. Vs. 3 (1895) 133-.
- — — — gravity. *Kuenen, J. P.* Amst. Ak. Vs. 4 (1896) 41-; *Arch. Néerl.* 1 (1898) 342-.

CRITICAL POINT.

- Cagniard-Latour, (le baron) C.* A. C. 21 (1822) 127-; 22 (1823) 410-; 23 (1823) 267-.
- Ramsay, W.* [1880] R. S. P. 31 (1881) 194-.
- Nadeždin, A. I.* (xii) Rs. Ps.-C. S. J. 14 (Ps.) (1882) [(Pt. 1)] 157-, 536-; 15 (Ps., Pt. 1) (1883) 25-; (x) A. Ps. C. Beibl. 7 (1883) 678-.
- Jamin, J. C.* C. R. 96 (1883) 1448-.
- (priority claim.) *Ramsay, W.* C. R. 97 (1883) 448-.

1880 Critical Point

adiabatic expansion near. *Natanson, W.* Krk. Ak. (Mt.-Prz.) Rz. 8 (1895) 220-; Cro. Ac. Sc. Bll. (1895) 130-.

adiabatics of system of liquid and gas. *Raveau, C.* Par. S. Ps. Sé. (1892) 266-.

anomalies. *Kuenen, J. P.* Amst. Ak. Vs. [2] (1894) 85-; Arch. Néerl. 1 (1898) 274-.

—, experiments. *Kuenen, J. P.* Amst. Ak. Vs. 3 (1895) 19-, 57-; Arch. Néerl. 1 (1898) 279-.

behaviour near. *Golicyn, B. A.* Ps. C. 50 (1893) 521-.

— at. *Gouy, —.* C. R. 116 (1893) 1289-.

capillarity near (carbon dioxide). *Verschaffelt, J.* Amst. Ak. Vs. 5 (1897) 94-; J. de Ps. 6 (1897) 445-.

—, *Eldik, A. van.* [1897] Amst. Ak. Vs. 6 (1898) 18-, 74-; J. de Ps. 7 (1898) 159-.

—, *Bakker, G. Z.* Ps. C. 35 (1900) 598-.

of carbon dioxide. *Garnett, W.* Nt. 16 (1877) 23.

condensation at. *Fuchs, K.* Exner Rpm. 26 (1890) 497-.

determination. *Guldberg, C. M.* Christiania F. (1882) No. 20, 10 pp.

—, *Pellat, H. J.* de Ps. 1 (1892) 225-.

—, Caillietet and Colardeau's method. *Grimaldi, G. P.* Rm. R. Ac. Linc. Rd. 1 (1892) (Sem. 1) 79-.

—, criterion. *Dickson, J. D. H.* Ph. Mg. 10 (1880) 40-.

— of density near. *Heen, P. de.* Brux. Ac. Bll. 31 (1896) 147-.

— — volumes of liquids and vapours above. *Heen, P. de.* Brux. Ac. Bll. 27 (1894) 580-.

effect of weight on fluids at. *Gouy, —.* C. R. 115 (1892) 720-.

electric conductivity at. *Bartoli, A.* Rm. R. Ac. Linc. Rd. 2 (1886) (Sem. 2) 129-.

errors for pure substances and mixtures. *Hirsch, R. von.* A. Ps. 1 (1900) 655-.

of ethyl ether, refractivity near. *Golicyn, B., & Wilip, J.* St. Pét. Ac. Sc. Bll. 11 (1900) 117-.

lecture experiment. *Barus, C.* Am. J. Sc. 2 (1896) 1-.

meniscus formation, influence of time. *Heen, P. de.* Brux. Ac. Bll. 25 (1893) 14-.

of mixed gases. *Andsell, G.* [1882] R. S. P. 34 (1883) 113-.

— some organic compounds. *Altschul, M. Z.* Ps. C. 11 (1893) 577-.

phenomena. *Zambiasi, G.* Rm. R. Ac. Linc. Rd. 1 (1892) (Sem. 2) 423-.

physical state near. *Caillietet, L., & Colardeau, E.* C. R. 108 (1889) 1280-.

properties of liquids near. *Golicyn, B. B.* St. Pét. Ac. Sc. Bll. 10 (1899) xxxiv-.

— pure gases near. *Villard, P.* Par. S. Ps. Sé. (1894) 244-.

— — — (Villard). *Wesendonck, K. A.* Ps. C. 55 (1895) 577-.

state of matter near. *Caillietet, L., & Colardeau, E.* A. C. 18 (1889) 269-.

Critical State 1880

state of matter near. *Lepsius, B.* Frkf. a. M. Ps. V. Jbr. (1890-91) 27.

— — at. *Battelli, A.* Ven. I. At. (1891-92) 1615-; (1892-93) 685-.

— — near. *Dwelschawers-Dery, F. V.* Brux. Ac. Bll. 30 (1895) 570-.

and vapour pressure of water. *Caillietet, L., & Colardeau, E.* C. R. 112 (1891) 1170-; Par. S. Ps. Sé. (1891) 172-.

variation in vapour pressure near. *Raveau, —.* Par. S. Ps. Sé. (1893) 57-.

Critical pressure, calculation. *Dutoit, P., & Friderich, L.* Arch. Sc. Ps. Nt. 5 (1893) 574-.

— of ice. *Butlerow, A.* St. Pét. Ac. Sc. Bll. 27 (1881) 273-.

— for solids, so-called. *Richter, — von.* Bresl. Schl. Gs. Jbr. (1885) 132-.

— solution point, influence of pressure. *Lee, N. J. van der.* Z. Ps. C. 33 (1900) 622-.

CRITICAL STATE.

Ramsay, W. R. S. P. 30 (1880) 323-.

Stolyetov, A. G. (xii) Rs. Ps.-C. S. J. 14 (Ps.) (1882) [(Pt. 1)] 167-; (xi) J. de Ps. 1 (1882) 543-.

(Stolyetov.) *Zaionchevskii, V.* (xii) Rs. Ps.-C. S. J. 14 (Ps.) (1882) [(Pt. 1)] 386-.

Stolétov, A. G. Mosc. S. Sc. Bll. 78 (No. 1) (1892) 1-; Fschr. Ps. (1892) (Ab. 2) 190-; Rs. Ps.-C. S. J. 25 (Ps.) (1893) 303-; 26 (Ps.) (1894) 26-; J. de Ps. 3 (1894) 571-; 4 (1895) 579.

Battelli, A. Rm. R. Ac. Linc. Rd. 2 (1893) (Sem. 1) 171-.

Ramsay, W. Z. Ps. C. 14 (1894) 486-.

Wesendonck, K. Z. Ps. C. 15 (1894) 262-.

Zambiasi, G. Rm. R. Ac. Linc. Rd. 4 (1895) (Sem. 2) 127-.

Dieterici, C. A. Ps. C. 69 (1899) 685-; Ps. Z. 1 (1900) 73-.

accidental character. *Heen, P. de.* Brux. Ac. Bll. 27 (1894) 348-.

carbon dioxide, coloured by iodine. *Villard, P.* Par. S. Ps. Sé. (1894) 242-.

condensation in mixtures near. *Hartman, C. M. A.* [1900] Amst. Ak. Vs. 9 (1901) 60-; Amst. Ak. P. 3 (1901) 66-.

theory. *Reis, P.* Humb. 7 (1888) 369-, 409-.

CRITICAL TEMPERATURES.

Moutier, J. Par. S. Phlm. Bll. 2 (1878) 75-.

Pawlewski, B. Berl. B. 15 (1882) 460-.

Nadeždin, A. I. [1885] Kiev S. Nt. Mm. 8 (1) (1886) 1.

Prytz, K. Ts. Ps. C. 26 (1887) 33-.

Golicyn, B. B. Rs. Ps.-C. S. J. 22 (Ps.) (1890) 265-; Fschr. Ps. (1890) (Ab. 2) 248-; J. de Ps. 1 (1892) 474-.

Ladenburg, —. Bresl. Schl. Gs. Jbr. (1890) (At. B.) 20-.

Bulatov, A. Rs. Ps.-C. S. J. 31 (Ps.) (1899) 69-.

behaviour near. *Clark, J. W.* [1880] L. Ps. S. P. 4 (1881) 41-; Ph. Mg. 10 (1880) 145-.

1880 *Critical Temperatures*

- and boiling point. *Bartoli, A.* N. Cim. 16 (1884) 74-; 20 (1886) 139-.
- — —, hydrogen. *Olzowski, K.* Krk. Ak. (Mt.-Prz.) Rz. 9 (1895) 404-; Ph. Mg. 40 (1895) 202-.
- causes underlying. *Avenarius, M.* [1876] St. Pét. Ac. Sc. Bil. 22 (1877) 378-.
- change of state near. *Caillaet, L., & Haute-feuille, P.* C. R. 92 (1881) 840-.
- and change of state. *Walterhöfer, O.* Humb. 5 (1886) 404-.
- of compound esters. *Pawlewski, B.* (xii) Kosmos (Lw.) 7 (1882) 1-, 130-, 303-; (x) Berl. B. 15 (1882) 2460-; 16 (1883) 2633-.
- — — (Pawlewski). *Nadeždin, A.* Rs. Ps.-C. S. J. 16 (Ps.) (1884) 74-.
- as criterion of chemical purity. *Altschul, M.* Berl. Ps. Gs. Vh. (1895) 1-.
- — — —. *Pictet, R.* C. R. 120 (1895) 43-.
- determination. *Golicyn, B. B.* Mosc. S. Sc. Bil. 73 (No. 2) (1891) 5-; Fsch. Mth. (1891) 1188-.
- *Chappuis, J.* C. R. 118 (1894) 976-.
- in opaque tubes. *Nadeždin, A. I.* [1885] Kiev S. Nt. Mm. 8 (1) (1886) xvii-; St. Pét. Ac. Sc. Bil. 30 (1886) 327-.
- of volume of liquid at. *Žuk, K. N.* [1885] Kiev S. Nt. Mm. 8 (1) (1886) xviii-.
- of hydrogen. *Natanson, W.* Krk. Ak. (Mt.-Prz.) Rz. 7 (1895) 374-; Cre. Ac. Sc. Bil. (1895) 93-.
- liquid, influence of pressure of gas. *Schiller, N. N.* [1894] Kiev S. Nt. Mm. 15 (1) (1896) lix-.
- mixtures. *Straus, O. E.* (xii) Rs. Ps.-C. S. J. 12 (Ps.) (1880) [(Pt. 1)] 207-.
- physical state at. *Guye, P. A.* C. R. 110 (1890) 141-.
- and pressure. *Engel, R.* Rv. Sc. 3 (1882) 691-.
- *Vincent, C., & Chappuis, J.* C. R. 103 (1886) 379-; J. de Ps. 5 (1886) 58-.
- of oxygen. *Wróblewski, Z.* [1883] (xii) Krk. Ak. (Mt.-Prz.) Rz. & Sp. 11 (1884) lxxx-; (xi) C. R. 97 (1883) 309-.
- and volume, carbon disulphide and water. *Battelli, A.* Tor. Ac. Sc. Mm. 41 (1891) 25-.
- of water. *Straus, O. E.* (xii.) Rs. Ps.-C. S. J. 14 (Ps.) (1882) (Pt. 1) 510-.
- pressure of water vapour at. *Caillaet, L., & Colardeau, E.* C. R. 112 (1891) 1170-; Par. S. Ps. Sé. (1891) 172-.
- reappearance of liquid at. *Duvelshauvers-Dery, E. V.* Brux. Ac. Bil. 31 (1896) 277-.
- solutions of solids. *Pictet, R.* C. R. 120 (1895) 64-.
- and surface tension. *Eötvös, L.* Mth. Term. Ét. 3 (1885) 54-.
- thermal and calorific constants at. *Laar, J. J. van.* Z. Ps. C. 11 (1893) 721-.
- and thermal expansion of liquid, relations. *Bartoli, A., & Stracciati, E.* N. Cim. 16 (1884) 91-.
- — — —. — (Bartoli and Stracciati). *Thorpe, T. E., & Rücker, A. W.* L. Ps. S. P. 8 (1887) 34-; Ph. Mg. 21 (1886) 431-.

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- and thermal expansion of liquid, relations (Thorpe and Rücker). *Bartoli, A., & Stracciati, E.* Ph. Mg. 22 (1886) 533-.
- variability. *Heen, P. de.* Brux. Ac. Bil. 24 (1892) 96-.
- variation of temperature of transformation around. *Heen, P. de.* Brux. Ac. Bil. 25 (1893) 695-.
- Critical volume, determination. *Young, S. L.* Ps. S. P. 12 (1894) 137-; Ph. Mg. 34 (1892) 503-.
- — —, *Laar, J. J. van.* Z. Ps. C. 11 (1893) 661-.
- Density of sulphur dioxide as liquid and as saturated vapour. *Caillaet, L., & Mathias, E.* C. R. 104 (1887) 1563-; Par. S. Ps. Sé. (1887) 162-.
- Determination of densities of liquefied gases and their saturated vapours. *Amagat, —.* C. R. 114 (1892) 1093-, 1322-; Par. S. Ps. Sé. (1892) 230-, 242-.
- Different states of matter. *Bogaevskij, L.* St. Pét. Ac. Sc. Mm. 5 (1897) No. 13, 104 pp.
- Fluid, limiting steam-liquid temperature. *Thomson, (Sir) W. B. A.* Rp. (1880) 496-.
- Gaseous and liquid states, properties. *Groshans, J. A.* [1864-78] Arch. Sc. Ps. Nt. 23 (1865) 73-; A. Ps. C. 6 (1879) 119-.
- state. *Andrews, T.* Phil. Trans. 166 (1876) 421-.
- Isometrics of liquid matter. *Barus, C.* Ph. Mg. 30 (1890) 338-.
- Isothermals for dissociated mixtures. *Ikeda, K.* Z. Ps. C. 33 (1900) 287-.
- empirical and theoretical, of mixtures. *Blümcke, A.* Z. Ps. C. 6 (1890) 153-, 407-.
- — — —, variation with temperature. *Blümcke, A.* Z. Ps. C. 8 (1891) 554-; 9 (1892) 78-.
- Liquefied gases. *Dewar, J.* [1884] R. I. P. 11 (1887) 148-.
- Natterer's tubes, effects of mirage and differences of density. *Villard, P.* C. R. 121 (1895) 115-; Par. S. Ps. Sé. (1896) 73-.
- — —, phenomena. *Gouy, —.* C. R. 121 (1895) 201-.
- — —, properties. *Raveau, —.* Par. S. Ps. Sé. (1892) 213-.
- Physical and chemical phenomena at low temperatures. *Stuginov, N. P.* Kazan S. Ps.-Mth. Bil. 3 (1893) (Prot.) 23-.
- Ratio of heat of internal vaporisation to difference of densities. *Mathias, —.* Par. S. Ps. Sé. (1900) 84*-.
- State of matter characterised by independence of pressure and specific volume. *Heen, P. de.* Brux. Ac. Bil. 24 (1892) 267-.
- Surface between liquid and vapour, influence of external pressure. *Schiller, N. N.* Rs. Ps.-C. S. J. 30 (Ps.) (1893) 79-.
- Thermal properties of ethyl oxide. *Ramsay, W., & Young, S.* [1886] Phil. Trans. (A) 178 (1888) 57-.
- — — methyl alcohol. *Ramsay, W., & Young, S.* [1887] Phil. Trans. (A) 178 (1888) 313-.

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Thermal properties of propyl alcohol. *Ramsay, W., & Young, S.* [1888-89] *Phil. Trans.* (A) 180 (1890) 137-.

Transformation of state of bodies, new theory. *Moulin, H.* *Par. S. Ps. Sé.* (1896) 45-, 268-.

Tubes of Cagniard de la Tour. *Biernacki, W.* *Wiad. Mt.* 2 (1898) 126-.

Van der Waals's surface for mixtures, plait-points. *Kuenen, J. P.* *Amst. Ak. Vs.* [2] (1894) 28-; *Arch. Néerl.* 1 (1898) 270-.

vapours not obeying. *Leduc, A.* *C. R.* 128 (1899) 1314-.

of van der Waals. *Mathias, E.* *C. R.* 112 (1891) 85-, 404; *Toul. Fac. Sc. A.* 5 (1891) F, 24 pp.

— — — — — *Young, S.* [1892-93] *L. Ps. S.* P. 11 (1892) 233-; *Ph. Mg.* 33 (1892) 153-; *L. Ps. S. P.* 12 (1894) 447-; *Ph. Mg.* 37 (1894) 1-.

— — — — — *Amagat, E. H.* *C. R.* 123 (1896) 30-, 83-.

— — — — — *Raveau, C.* *C. R.* 123 (1896) 100-.

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Meyer [née Bjerrum], K. [1899] *Kjøb. Dn. Vd. Selsk. Skr.* 9 (1898-1901) 155-; *Z. Ps. C.* 32 (1900) 1-.

Coefficients of expansion and compression in corresponding states. *Waals, J. D. van der.* *Amst. Ak. Vh.* 20 (1880) (Nos. 6 & 7) 32+11 pp.; *A. Ps. C. Beibl.* 5 (1881) 27-, 250-.

Corresponding pressures, diameter of densities at. *Mathias, E. J.* *de Ps.* 2 (1893) 224-.

— temperatures. *Groshans, J. A.* *Cosmos* 3 (1866) 285-, 310-.

— — (Groshans's rule). *Bartoli, A., & Straciaci, E. N.* *Cim.* 18 (1885) 193-.

— — *Dühring, U.* *A. Ps. C.* 52 (1894) 556-.

— — with equal vapour pressures. *Groshans, J. A.* *A. Ps. C.* 60 (1897) 169-; *Arch. Néerl.* 1 (1897) 142-.

Isothermal compressibility of liquids and gases, and corresponding states. *Brillouin, M. J.* *de Ps.* 2 (1893) 113-.

Law of thermodynamic unity. *Kowalski, J.* *Par. S. Ps. Sé.* (1893) 261-.

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Waals, J. D. van der. *Amst. Ak. Vh.* 21 (1881) (No. 5) 10 pp.; *A. Ps. C. Beibl.* 5 (1881) 567-.

Bakker, G. Z. *Zs. C.* 21 (1896) 127-, 507-.

Waals, J. D. van der (jun.). [1896] *Amst. Ak. Vs.* 5 (1897) 248-; *Fschr. Ps.* (1896) (Ab. 2) 200-.

Moulin, —. *Par. S. Ps. Sé.* (1899) 16*-.

Berthelot, D. *C. R.* 131 (1900) 175-.

application to dissolved substances. *Waals, J. D. van der.* *Amst. Ak. Vs. M.* 9 (1892) 346-; *Fschr. Ps.* (1892) (Ab. 1) 377-.

and characteristic equation of fluids. *Raveau, C.* *Par. S. Ps. Sé.* (1896) 274-.

corresponding boiling points. *Dühring, U.* *A. Ps. C.* 11 (1880) 163-.

— — — — — (Dühring). *Winkelmann, A. A.* *A. Ps. C.* 11 (1880) 534-.

— — — — — priority claim. *Dühring, U.* *C. R.* 91 (1880) 980-; *Z. Ps. C.* 13 (1894) 492-.

and critical phenomena. *Zambiasi, G.* *Rm. R. Ac. Linc. Rd.* 3 (1894) (Sem. 2) 184-.

— law of rectilinear diameter. *Mathias, E. J.* *de Ps.* 8 (1899) 407-; *Liège S. Sc. Mm.* 2 (1900) No. 1, 28 pp.

for mixtures of carbon dioxide and hydrogen. *Verschaell, J. E.* *Arch. Néerl.* 5 (1900) 644-.

— — — liquids. *Kowalski, J.* *Par. S. Ps. Sé.* (1893) 259-.

relations expressing. *Amagat, E. H.* *C. R.* 124 (1897) 547-.

Adiabatic changes of state of crystals in solid and liquid states. *Tammann, G.* [1899-1900] *Dorpat Sb.* 12 (1901) 270-; *A. Ps.* 1 (1900) 275-.

— — — — — liquid and its saturated vapour. *Phillips, E.* *C. R.* 70 (1870) 548-.

Coexistent phases, pressure. *Waals, J. D. van der.* *Arch. Néerl.* 26 (1893) 91-.

— — — vapour pressure. *Cantor, M. A.* *Ps. C.* 67 (1899) 683-.

Equilibrium of 2 bodies, quadruple points. *Roozeboom, H. W. B.* *Rec. Tr. C. P.-Bas* 5 (1886) 393-.

— — — — — chemical, in dilute solution and in gaseous state. *Hoff, J. H. van't.* [1886] *Stockh. Ak. Hndl.* 21 (1884-87) No. 17, 58 pp.

— — — of complex solid in presence of gas and liquid. *Waals, J. D. van der.* *Amst. Ak. Vs.* 5 (1897) 482-; *Arch. Néerl.* 1 (1898) 78-.

— — — crystalline and vapour phase. *Roozeboom, H. W. B.* *Arch. Néerl.* 5 (1900) 360-.

— — — fluid and solid in contact, change of melting point by pressure. *Riecke, E.* *Gött. Nr.* (1894) 278-.

— — — gaseous solutions and solid hydrates. *Waals, J. D. van der.* *Amst. Ak. Vs. M.* 1 (1885) 377-; *Rec. Tr. C. P.-Bas* 4 (1885) 135-.

— — — — — (van der Waals). *Roozeboom, H. W. B.* *Rec. Tr. C. P.-Bas* 5 (1886) 335-.

— — — — — gases. *Marek, W. J.* *Carl Rpm.* 18 (1882) 544-.

— — — laws, identity in chemical, physical and mechanical phenomena. *Le Chatelier, H.* *Rv. Sc.* 40 (1887) 646-.

— — — and movement of mixed fluids. *Duhem, P.* *Lille Tr. Mm.* 3 (1893) *Mém.* 11, 136 pp.

— — — of saturated vapour and its liquid. *Schüller, N.* *Mosc. S. Sc. Bll.* 91 (No. 2) (1895) 7-; *Fschr. Mth.* (1895) 1048-.

— — — solid and liquid compounds of water with salts. *Roozeboom, H. W. B.* *Arch. Néerl.* 23 (1889) 199-.

— — — solids, liquids and vapours. *Waals, J. D. van der.* *Amst. Ak. Vs. M.* 7 (1890) 4.

- Equilibrium in ternary systems with 2 liquid phases. *Schreinemakers, F.* Amst. Ak. Vs. 6 (1898) 65-; Arch. Néerl. 1 (1898) 411-; 2 (1899) 21-, 144-; 3 (1900) 1-, 273-.
- Modifications in specific volume of saturated vapour and of liquid due to changes of temperature, relation. *Waal, J. D. van der.* Arch. Néerl. 5 (1900) 407-.
- "Phase doctrine," application to iron and steel. *Roozeboom, H. W. B.* I. & S. I. J. (1900) (No. 2) 311-.
- rule, demonstration. *Saurel, P.* J. Ps. C. 3 (1899) 69-.
- Stability of irreversible hydrosols. *Hardy, W. B.* R. S. P. 66 (1900) 110-.
- Triple point, property. *Moutier, J.* Par. S. Phlm. Bll. 3 (1879) 233-.
- points of bromine and iodine. *Tsuruta, K.* Ps. Z. 1 (1900) 417-.

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- Air, relations to heat, cold, and moisture. *Leslie, J.* Tilloch Ph. Mg. 41 (1813) 446-.
- Aspirator, ether. *Dupont, M.* [1881] Par. S. Phlm. Bll. 6 (1882) 74-.
- , siphon. *Dupont, M.* [1881] Par. S. Phlm. Bll. 6 (1882) 21-.
- Atmidometer. *Bellani, A.* Brugatelli G. 9 (1816) 102-, 188-, 250-, 417-; 10 (1817) 348-, 422-; 3 (1820) 166-.
- , *Reischauer, C. [G.], & Vogel, A.* Münch. Gelehrte Az. 42 (1856) (Bll.) No. 1, 15-.
- Atometer. *Anderson, A.* Edinb. Ph. J. 2 (1820) 64-.
- "Chameleon" barometer, value as hygrometer. *Smith, A. P.* Nt. 11 (1875) 307, 365.
- Condensation of vapour on cold surface. *Dalmahoy, J.* [1851] Edinb. R. S. T. 20 (1853) 299-.
- — — Rhône glacier. *Dufour, C.* As. Fr. C. R. 7 (1878) 285-.
- Desiccator, mean temperature, calculation. *Grassi, G.* Nap. I. Inc. At. 6 (1887) No. 3, 15 pp.
- Dew formation, observations. *Alvord, H. E.* Am. As. P. (1886) 113-.
- Dew point found from cold produced by evaporation. *Meikle, H.* Edinb. N. Ph. J. 16 (1834) 98-; 18 (1835) 319-.
- observations, Pike's Peak, test of Regnault's formula and tables. *Abbe, C.* [U. S.] Chief Sig. Off. A. Rp. (*1880) 852-.
- and psychrometer indications, relation. *Hazen, H. A.* [U. S.] Chief Sig. Off. A. Rp. (1890) 658-.
- — — psychrometric tables. *Marvin, C. F.* [U. S. Chief Sig. Off. A. Rp. (1891)] 351-.
- Evaporation and precipitation in atmosphere. *Parrot, G. F.* Gilbert A. 10 (1802) 166-.
- — — (Parrot). *Böckmann, C. W.* Gilbert A. 11 (1802) 66-.

- Evaporation and precipitation in atmosphere (Parrot). *Wrede, E. F.* Gilbert A. 12 (1803) 319-.
- Humidity, determination. *Sohlberg, K. H.* Stockh. Öfv. (1890) 49-; Fsch. Ps. (1890) (Ab. 2) 345-.
- , — by psychrometer and hair-hygrometer. *Koppe, C.* Wien Met. Z. 13 (1878) 49-.
- , — — spectroscope. *Cory, F. W.* [1887] Met. S. QJ. 14 (1888) 85-.
- , — —. *Arendt, T.* Met. Z. 13 (1896) 376-.
- , — —. *Jewell, L. E.* Asps. J. 4 (1896) 324-.
- at high temperatures, calculation from observations of wet and dry bulb thermometers. *Strachan, R.* Nt. 35 (1887) 7.
- low temperatures. *Marvin, C. F.* [U. S.] Chief Sig. Off. A. Rp. (1890) 650-; (1891) 351-.
- , psychrometric method, and tables for direct deduction. *Hazen, H. A.* U. S. Weath. Bur. Rp. (1897-98) 327-.
- , relative. *Weihrauch, K.* Mosc. S. Nt. Bll. 59 (1884) 1-, 304-.
- of soil. *King, —.* A. Agn. 22 (1896) 161-.
- Hydroscope of Sinesio. *Angelelli, M.* [1842] (vi Add.) N. A. Sc. Nt. 1 (1844) 5-.
- Hydrosopic researches of Abbé Paramelle. *Maillet, —.* (viii) Reims Sé. Ac. 5 (1847) 265-.
- Hygrometric calculations, slide rule for. *Welsh, J. B. A.* Rp. (1851) (pt. 2) 42-.
- method, new. *Delarive, A.* Bb. Un. 28 (1825) 285-.
- , —. *Emmerich, R.* [1891] Münch. Gs. Mph. Pl. Sb. 7 (1892) 143-.
- methods, experimental investigation. *Vogel, A.* Münch. Ab. 8 (1860) 295-.
- principles. *Ide, J. J. A.* Mosc. Cm. S. Ps. Md. 1 (1808) 105-.
- properties of insoluble compounds. *Griffiths, T.* QJ. Sc. 19 (1825) 92-.
- — wool. *Maxmené, E. J.* (viii) Reims Sé. Ac. 11 (1850) 80-.
- state of air as affecting temperature of bodies. *Papasogli, —.* Arch. Phm. 224 (1886) 559.
- — —, determination. *Suerman, A. C. G.* Leijd. A. Ac. (1829-30) 123 pp.
- — —, diagrammatic representation. *Passaro, E.* Nap. I. Inc. At. 3 (1890) No. 5, 12 pp.
- tables, construction. *Pichot, A.* C. R. 46 (1858) 1052-.
- for dew-point and relative humidity. *Abbe, C.* [U. S.] Chief Sig. Off. A. Rp. (*1881) 1138-.
- use of sulphuric acid. *Delarive, A.* Arch. Sc. Ps. Nt. 44 (1872) 79-.

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- Ludicke, M. A. F.* Gilbert A. 1 (1799) 282-; 2 (1799) 70-; 5 (1800) 79-.
- Arnim, L. A. von.* Gilbert A. 4 (1800) 308-.

1890 *Hygrometers*

- Aubuisson de Voisins, J. F. d'. J. Mines* 27 (1810) 411-.
- (Dalton's.) *Erman, P. Gilbert A.* 40 (1812) 389-.
- Melloni, M.* [1829] *A. C.* 43 (1830) 39-.
- Prinsep, J.* *Gleanings Sc.* 1 (1829) 45-, 189-.
- Kämtz, L. F.* *Quetelet Cor. Mth.* 10 (1838) 350-.
- Colson, J. H.* *Brux. A. Un.* (1843) 75-.
- Scherpenzeel-Thim, J. H. von.* *Brux. A. Un.* 2 (1843) 171-.
- Regnault, V. C. R.* 20 (1845) 1127-, 1220-.
- (Regnault.) *Majocchi, G. A.* (vi *Adds.*) *Majocchi A. Fis. C.* 22 (1846) 29-, 233-; 23 (1846) 33-, 274-.
- Lefebvre, G. A. C.* 25 (1849) 111-.
- Regnault, V. C. R.* 35 (1852) 930-; *A. C.* 37 (1853) 257-.
- Avé-Lallement, G. M. F.* (xii) *Arg. S. Ci. A.* 4 (1877) 252-.
- Crona, A.* [1883] *Mntp. Ac. Mm.* 10 (1884) 411-.
- Jamin, J. C. R.* 98 (1884) 1561-.
- application of cold of evaporation to. *August, E. F. Pogg. A.* 5 (1825) 69-, 335-.
- August's formula. *Kupffer, A. T. St. Pét. Ac. Sc. Bl.* 6 (1840) 337-.
- and barometry. [*Shortrede non*] *Shortreed, R. R. S. P.* 5 (1845) 548-.
- experiments. *Leslie, J. Tilloch Ph. Mg.* 42 (1813) 44-.

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- Leslie, J. Nicholson J.* 3 (1800) 461-; *A. C.* 35 (1800) 3-.
- Voigt, F. W.* *Gilbert A.* 3 (1800) 126-.
- Berzelius, J. J.* *Hisinger Afh. Fys.* 2 (1807) 35-; *Tilloch Ph. Mg.* 33 (1809) 39-.
- Adie, Alex.* [1819] *Edinb. Mm. Wern. S.* 3 (1817-20) 483-.
- Livingstone, J.* *Edinb. Ph. J.* 1 (1819) 116-.
- Jones, T.* [1825] *Phil. Trans.* (1826) (pt. 2) 53-.
- (Jones.) *Daniell, J. F. QJ. Sc.* 21 (1826) 320-.
- Baumgartner, A. von.* *Baumgartner Z.* 5 (1829) 293-.
- Anon.* (vi 353) *Edinb. N. Ph. J.* 15 (1833) 273-; 17 (1834) 330-.
- Mason, J. A.* *Thomson Re.* 4 (1836) 23-, 96-.
- Majocchi, G. A.* (vi *Adds.*) *Majocchi A. Fis. C.* 1 (1841) 30-.
- (modified thermometer.) *Nollet, F. J. C. Méd.* 8 (1842) 185-.
- Majocchi, G. A.* (vi *Adds.*) *Majocchi A. Fis. C.* 14 (1844) 57-, 143-.
- Belli, G. A. C.* 15 (1845) 506-.
- Majocchi, G. A.* *A. C.* 19 (1847) 77-.
- Batchelder, J. M.* *Franklin I. J.* 18 (1849) 444-.
- Whitehouse, W. R. S. P.* 20 (1872) 180-.
- Wolpert, A.* *Carl Rpm.* 9 (1873) 160-.
- Edelmann, M. T.* [1878] *A. Ps. C.* 6 (1879) 455-.
- Dines, G.* [1879] *Met. S. QJ.* 6 (1880) 39-.
- Stok, J. P. van der.* *Batavia Ntk. Ts.* 38 (1879) 200-.
- Hertz, H. R.* (xii) *Berl. Ps. Gs. Vh.* 1 (1882) 18-.

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- Bourbouze, —.* *J. de Ps.* 4 (1885) 425-.
- Tait, —.* *Edinb. R. S. P.* 13 (1886) 116-.
- Pizzarello, A.* [1888] *Moncalieri Oss. Bl.* 9 (1899) 131-.
- Agamennone, G., & Bonetti, F.* *Rm. R. Ac. Linc. Rd.* 1 (1892) (*Sem.* 2) 216-; 3 (1894) (*Sem.* 2) 23-.
- Anon.* *Cztg. Opt.* 16 (1895) 111-, 123-.
- Pettinelli, P.* *Rv. Sc. Ind.* 29 (1897) 93-.
- absorption-. *Hasselt, A. van.* (xii) *Mbl. Nt.* 9 (1879) 71-, 101-; *Forsch. Ag.-Ps.* 3 (1880) 204-.
- , *Matern, A.* [1879-80] *A. Ps. C.* 9 (1880) 147-; 10 (1880) 149-.
- , *Voller, C. A.* *Hamb. Nw. Vr. Vh.* 4 (1880) 100-.
- , *Weber, R.* *Neuch. S. Sc. Bl.* 27 (1899) 54-.
- , calibration. *Crova, A.* [1883-84] *Mntp. Ac. Mm.* 10 (1884) 548-.
- , Rüdorff's, modification. *Neesen, F. A. Ps. C.* 11 (1880) 526-.
- Arundo phragmites.* *Adie, Alex.* *Edinb. Ph. J.* 1 (1819) 32-.
- balance-. *Snellen, M.* [with note by *Baumhauer, E. H. von.*] *Arch. Néerl.* 9 (1874) 477-.
- bifilar. *Klinkerfues, E. F. W.* *Dingler* 226 (1877) 100-.
- (of Klinkerfues). *Müttrich, A.* *Wien Met. Z.* 15 (1880) 170-.
- Daniell's.* *Brouwer, S.* *Hall Bij.* 6 (1831) 272-.
- , modification. *Pfeiffer, (Dr.) L.* *Z. Bl.* 9 (1873) 243-.
- dew-point. *Foggo, J.* *Edinb. J. Sc.* 4 (1826) 127; 7 (1827) 36-.
- , *Sonklar, K. von.* *Wien SB.* 22 (1856) 271-.
- , *Bourbouze, —.* *C. R.* 100 (1885) 1538-.
- , *Sire, G.* [1885] *C. R.* 101 (1885) 638; *Arch. Sc. Ps. Nt.* 14 (1885) 220-; *Doubs S. Mm.* 10 (1886) 164-.
- , *Dufour, H.* [1888-89] *Laus. S. Vd. Bl.* 24 (1889) 88-; *J. de Ps.* 8 (1889) 74-.
- , *Gilbault, H.* *C. R.* 114 (1892) 67-.
- , with tables. *Yvon, P.* *J. de Phm.* 28 (1878) 103-.
- , and wet bulb thermometer. *Espy, J. P.* *Franklin I. J.* 13 (1834) 81-.
- direct, modification. *Chistoni, C.* [1883] *Spet. It. Mm.* 12 (1884) 81-.
- Edelmann. Cancani, A.* *Rm. R. Ac. Linc. Rd.* 1 (1885) 475-.
- electric. *Blake, L. I.* *Kan. Ac. Sc. T.* 12 (1890) 67-.
- empirical calibration. *Sire, G.* *C. R.* 101 (1885) 312-.
- ether. *Adie, John.* *Edinb. J. Sc.* 1 (1829) 60-.
- by evaporation. *Ivory, J.* *Tilloch Ph. Mg.* 60 (1822) 81-.
- and evaporation. *Meikle, H.* *Edinb. N. Ph. J.* 2 (1827) 22-.
- expansion-. *Cozza, R.* *Arch. Sc. Ps. Nt.* 10 (1900) 132-.
- gelatin. *Nodon, A.* *Par. S. Ps. Sé.* (1886) 148-.

1890 Hygrometers

- hair-. *Babinet, J.* Edinb. J. Sc. 1 (1824) 309-; *Pogg. A.* 2 (1824) 77-.
- , *Pictet, M. A.* Bb. Un. 27 (1824) 120-.
- , *Prinsep, J.* QJ. Sc. 22 (1827) 28-.
- , *Hermann, F.* Sch. Nf. Gs. Vh. 53 (1869) 76-.
- , *Sire, G.* [1872] (xii) Doubs S. Mm. 7 (1873) 101-.
- , *Koppe, C.* Dingler 226 (1877) 297-.
- , *Meyn, R.* Carl Rpm. 14 (1878) 51-.
- , maximum and minimum, de Saussure's registering. *Landriani, M.* Brugnatelli G. 3 (1820) 110-.
- , —, —, —, *Char[r]ière, A., & Midre,* Lyon S. Ag. A. 4 (1860) 184-.
- , with spring. *Reinbot, P.* (xii) Rs. Ps.-C. S. J. 12 (Ps.) (1880) [(Pt. 1)] 243-, 247-.
- , use. *Trowbridge, C. C.* Science 4 (1896) 62-.
- history. *Symons, G. J.* Met. S. QJ. 7 (1881) 161-.
- and hygrometric methods. *Tschaplowitz [Chaplovits], F.* Lindw. V.-St. 27 (1882) 65-.
- Leslie's. Watson, H. H.* B. A. Rp. (1834) 569.
- and hair-. *Lüdicke, M. A. F.* Gilbert A. 10 (1802) 110-.
- , de Saussure's and de Luc's, comparison. *Böckmann, C. W.* Gilbert A. 15 (1803) 355-.
- Majocchi's. Regnault, V. A. C.* 19 (1847) 82-.
- portable. *Hayes, A. A.* Silliman J. 17 (1830) 351-.
- registering. *Baumhauer, E. H. von.* Pogg. A. 93 (1854) 343-.
- , *Vivian, E.* (viii) Devon. As. T. (pt. 2) (1863) 50.
- , *Nodon, A.* C. R. 102 (1886) 1371-.
- , maximum and minimum. *Donovan, M.* Ir. Ac. P. 1 (1874) 476-, 556-; 2 (1877) 166-.
- Regnault's. Donovan, M.* [1869] Ir. Ac. P. 10 (1870) 459-.
- de Saussure's. *Pictet, M. A.* Bb. Un. 27 (1824) 22-.
- , improvement. *Cagnazzi, L. de S.* Nap. At. Ac. 1 (1819) 43-.
- sensitive. *Kater, H.* As. Researches 9 (1807) 24-, 394-.
- , *Holtz, W.* N.-Vorp. Mt. 17 (1886) 63-.
- silk-. *Parrot, G. F.* (viii) Pander Btr. Ntk. 1 (1820) 75-.
- slow-acting. *Franklin, B.* Am. Ph. S. T. 2 (1786) 51-.
- vegetable. *Soares-Barbosa, A.* Lisb. Mm. Ac. Sc. 1 (1797) 262-.
- wet bulb. *Marriott, W.* [1876] Met. S. QJ. 3 (1877) 283-.
- , formula for dew-point. *Apjohn, Jas.* Ph. Mg. 6 (1835) 182-; 7 (1835) 266-, 470-; 9 (1836) 187-.
- , hygrometric scale. *P., —.* Gleanings Sc. 1 (1829) 77-.
- , portable form. *Passerini, N.* Firenze Ac. Georg. At. 22 (1899) 41-.
- , theory. *Apjohn, Jas.* [1834] Ir. Ac. T. 17 (1837) 275-, 283-.
- and dry bulb. *Kämtz, L. F.* Pisa Misc. Md. Chir. 2 (1843) 207-.
- , —, —, *Marriott, W.* [1874] Met. S. QJ. 2 (1875) 271-.

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- wet and dry bulb. *Miller, S. H.* [1876] Met. S. QJ. 3 (1877) 150-.
- , —, —, experimental investigation. *Macé de Lépinay, J.* J. de Ps. 10 (1881) 17-.
- , —, —, formula. *Apjohn, Jas.* B. A. Rp. (1843) (pt. 2) 36-.
- , —, —, psychrometric tables for. *Coffin, J. H.* [1856] Smiths. Misc. Col. 1 (1862) 20 pp.
- , —, —, reliability. *Hazen, H. A.* Science 1 (*1883) 502-.
- Hygroscope. *Benout, —.* QJ. Sc. 1 (1830) 195-.
- , fir branch. *Doümet, N.* Par. Bll. S. Bt. 13 (1866) xlv-.
- , metal spiral. *Mithoff, O.* Czgt. Opt. 5 (1884) 137-.
- Hygrosopic motions of plants (anisotropy). *Verschaffelt, J.* [1891] Mbl. Nt. (1891-92) 13-.
- , properties of Canadian fossil fuels. *Hoffmann, G. C.* [1889] Cn. R. S. P. & T. 7 (1890) (Sect. 3) 41-.
- , —, cat-gut and hempen cord. *Corti, B.* Mod. Mm. S. It. 11 (1804) 642-.
- , —, mica. *Riess, P.* Pogg. A. 67 (1846) 354-.
- , —, textile fabrics. *Schlasing, T. (fils).* C. R. 116 (1893) 808-.
- , —, tissues. *Quekett, E. J.* [1840] Mcr. S. T. 1 (1844) 23-.
- Moist bulb problem. [Shortrede non] *Shortreed, R.* R. S. P. 5 (1848) 740-.
- Psychrometer, aspiration-. *Assmann, R.* Z. Instk. 12 (1892) 1-.
- , —, *Ellinger, H. O. G.* N. Ts. Fs. K. 2 (1897) 53-.
- , dry and wet bulb, and an improved chemical hygrometer. *Pembrey, M. S.* Ph. Mg. 35 (1893) 525-.
- , *Loew's. Scheurer, A., & Wild, E.* Mulhouse S. In. Bll. 68 (1898) 266-.
- , portable. *Passerini, N.* Rv. Sc.-Ind. 32 (1900) 43-.
- Psychrometers, theory. *Pernter, J. M.* [1883] Exner Rpm. 20 (*1884) 154-.
- Psychrometric tables and formula (vapour tension, dew-point and relative humidity), for whirled psychrometer. *Ferrel, W.* [U. S.] Chief Sig. Off. A. Rp. (1886) 233-.
- Saturation deficit. *Weihrauch, K.* Met. Z. 2 (1885) 260-.
- , —, *Meyer, H.* Met. Z. 4 (1887) 113-, [56].
- Temperature of vapour, Dalton's law. *Buquoy, G. von.* Oken Isis (1824) 751-.
- Vapour in atmosphere, determination. *Ekelund, A. W.* Sk. Nf. F. 1 (1839) 119-.
- , pressure in arable land. *Hervé-Mangon, C. F.* Cosmos 6 (1870) 75-.
- , —, atmosphere. *Apjohn, Jas., & Lloyd, H.* Ir. Ac. P. 1 (1841) 433-.
- , —, —, *Renour, P.* C. R. 47 (1858) 354-.
- , —, —, Dalton's theory. *Lamont, J.* Ph. Mg. 24 (1862) 350-.

1900 Sublimation

- Vapour pressure in atmosphere, maximum. *Pierre, V.* Wien SB. (1849) 267-, (Ab. 2) 30-.
- — —, method of measuring. *Pierre, V.* Wien SB. (1850) (Ab. 2) 63-.
- pressures, Regnault's, tests, and extension to lower temperatures. *Hazen, H. A.* [U. S.] Chief Sig. Off. A. Rp. (1890) 658-.
- — —, — — —, — — —. *Marvin, C. F.* [U. S. Chief Sig. Off. A. Rp. (1891)] 351-.

1900 Vaporisation of Solids. Sublimation.

- Camphor, motion towards light. *Tomlinson, C.* Ph. Mg. 24 (1862) 358-.
- — —, — — —. *Draper, J. W.* Ph. Mg. 25 (1863) 342-.
- Carbon dioxide snow, thermometric and cryogenic application. *Du Bois, H., & Wills, A. P.* D. Ps. Gs. Vh. (1899) 168-.
- Solids and vapours. *Bancroft, W. D.* Ps. Rv. 3 (1896) 401-.
- Vaporisation of fire-proof substances. *Hermstadt, S. F.* Berl. Ab. (1814-15) (Ps.) 63-.
- — — ice. *Schubler, G.* Würtb. Ab. 1 (1826) 211-.
- — — and snow. *Carradori, G.* Brugnatelli G. 5 (1812) 203-.
- — — iron at ordinary temperature. *Pellat, H.* C. R. 126 (1898) 1338.
- — —, limits. *Faraday, M.* Phil. Trans. (1826) 484-; R. I. P. 1 (1831) 70-.
- — — of metals by electricity. *Hopkins, (Rev.) G. H.* Nt. 10 (1874) 190-.
- — — at ordinary temperature. *Pellat, H.* C. R. 123 (1896) 104-.
- — — solids. *Baumgartner, G.* Carl Rpm. 13 (1877) 525-.
- Vapour pressure of solids and liquids, transition between. *Ramsay, W., & Young, S.* L. Ps. S. P. 8 (1887) 119-; Ph. Mg. 23 (1887) 61-, 138.
- Volatilisation of solids, influence of pressure. *Ramsay, W., & Young, S.* [1883] Phil. Trans. 175 (1885) 37-.
- Water vapour, sudden change to ice. *Bugge, —.* (vi Adds.) N. Al. J. C. 2 (1894) 701-.

1920 Solutions and Liquid Mixtures: Melting-Point, Boiling-Point, Vapour Pressure, etc.

- Acetic acid and water, distillation. *Aignan, —, & Chabot, P.* [1893] Bordeaux S. Sc. Mm. 4 (1894) xv-.
- Alcohol and carbon dioxide mixtures, density. *Blümcke, A.* A. Ps. C. 30 (1887) 243-.
- Alloys, eutectic, constitution. *Charpy, G.* Par. S. Ps. Sé. (1897) 87-.
- — —, fusibility. *Le Chatelier, —.* Par. S. Ps. Sé. (1894) 266.
- American petroleum and Russian kerosene, fractional distillation. *Wanklyn, J. A., & Cooper, W. J.* Ph. Mg. 40 (1895) 225-.
- Aqueous solutions, temperature of vapour from. *Zantedeschi, F.* Aten. It. 3 (1854) 14-.

Solutions and Liquid Mixtures 1920

- Boiling of mixtures of 2 liquids, and "bumping" of such mixtures. *Magnus, G.* Pogg. A. 38 (1836) 481-.
- — — point curves. *Speyers, C. L.* Am. J. Sc. 9 (1900) 341-.
- — — of solutions, measurement. *Raoult, F. M.* Isère S. Bil. 27 (1892) 633-.
- — — salt solutions, temperature of vapour from. *Rudberg, F.* Lieb. A. 16 (1835) 143-.
- — — — — — — — —. *Wüllner, A.* Pogg. A. 110 (1860) 387-.
- — — — — — — — —. *Gill, J.* Ph. Mg. 32 (1866) 481-.
- — — — — — — — —. *Müller, F. C. G.* Berl. B. 9 (1876) 1629-.
- — — — — — — — —. *Wüllner, F. H. A. A.* Berl. B. 10 (1877) 256-.
- — — — — — — — —. *Pfaundler, L.* Berl. B. 10 (1877) 463-.
- — — — — — — — —. *Müller, F. C. G.* Berl. B. 10 (1877) 1327-.
- — — — — — — — —. *Kahlbaum, G. W. A.* Basel Vh. 8 (1890) 418-.
- — — — — — — — —. *Sakurai, J.* [1893] Tök. Coll. Sc. J. 6 (1894) 1-.
- — — — — — — — —, and from mixed liquids. *Magnus, G.* Berl. Mb. (1861) 157-.
- Bubble formation in frozen liquids. *Karsten, G.* [1893] Schl.-Holst. Nt. Vr. Schr. 10 (1895) 309-.
- Carbon disulphide and carbon tetrachloride, distillation of mixtures. *Brown, F. D. C.* S. J. 39 (1881) 304-.
- Change of volume due to solution of salts in water. *Heritsch, A.* A. Ps. C. 36 (1889) 115-.
- Constitution of cryohydrates. *Ponsot, A.* Par. S. Ps. Sé. (1894) 278-.
- Corresponding states of salt solutions. *Bender, C.* A. Ps. C. 22 (1884) 179-; 31 (1887) 872-.
- Eutectic mixtures. *Guthrie, Fred.* L. Ps. S. P. 6 (1885) 124-; Ph. Mg. 17 (1884) 462-.
- Evaporation of solutions. *Laval, E.* Bordeaux S. Sc. Mm. 2 (1886) 37-.
- — —, saline. *Pfaundler, L.* D. Nf. Tbl. (*1875) 208.
- — — — —. *Moutier, J.* Par. S. Phlm. Bil. 5 (1881) 146-.
- — — — —. *Marguerite-Delacharlonny, P.* As. Fr. C. R. (1887) (Pt. 1) 198.
- — — — —, and water. *Lesage, P.* As. Fr. C. R. (1892) (Pt. 2) 238-; C. R. 115 (1892) 473.

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- Rüddorf, F.* Pogg. A. 114 (1861) 63-; 116 (1862) 55-.
- Guldberg, C. M.* C. R. 70 (1870) 1349-.
- Raoult, F. M.* C. R. 98 (1884) 1047-; J. de Ps. 3 (1884) 16-; 5 (1886) 64-; Rv. Sc. 37 (1886) 673-.
- Ponsot, A.* Par. S. C. Bil. 17 (1897) 578.
- Apparatus, use for molecular weight determination. *Nernst, W.* Z. Ps. C. 6 (1890) 573-.

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water, oily and otherwise. *Dufour, H.* Laus. S. Vd. Bll. 35 (1899) xxiii-
wine and dilute alcohol. *Boussingault, J. B.* Erdm. J. Pr. C. 47 (1849) 181-.

Freezing of aqueous solutions. *Dufour, L.* Laus. Bll. S. Vd. 6 (1860) 474-.

— solutions at constant temperature. *Colson, A.* C. R. 120 (1895) 991-.

Isothermals of carbon dioxide and sulphur dioxide mixtures. *Blümcke, A.* A. Ps. C. 36 (1889) 911-.

Lard and rosin mixture, melting point. *Olmsted, D.* Am. As. P. (1850) 33-.

Liquid mixtures, composition of vapour. *Winkelmann, A.* A. Ps. C. 39 (1890) 1-.

—, properties. *Lehfeldt, R. A.* [1898] L. Ps. S. P. 16 (1899) 83-, 289-; Ph. Mg. 46 (1898) 42-; 47 (1899) 284-.

Liquids, temperature variation on mixing. *Bussy, A. A. B., & Buignet, H.* C. R. 59 (1864) 673-, 785-.

—, — — — (Bussy and Buignet). *Favre, P.* A. C. R. 59 (1864) 783-.

—, — — —. *Jamin, J.* C. R. 70 (1870) 1309-; 71 (1870) 23-.

—, — — —, also contraction. *Klebnikof, P.* St. Pét. Ac. Sc. Bll. 6 (1863) 445-.

Micromanometer, investigations with. *Smits, A.* Amst. Ak. Vs. 5 (1897) 292-; Arch. Néerl. 1 (1898) 97-.

Mixtures, thermal study. *Favre, P. A. C.* R. 73 (1871) 717-.

—, thermochemistry. *Favre, P. A.* (vn) Marseille Mm. S. Ém. 1 (1861) 117-.

Molecular equilibrium in mixed liquids. *Duclaux, É.* J. de Ps. 5 (1876) 13-.

Mutual solubility of salts. *Le Chatelier, H.* Par. S. Ps. Sé. (1894) 268-.

Orthobaric curves for homogeneous fluids, concordance. *Natanson, W.* Krk. Ak. (Mt.-Prz.) Rz. 3 (1891) 390-; Ph. Mg. 33 (1892) 152.

Osmotic equilibrium. *Ponsot, —.* Par. S. Ps. Sé. (1895) 121-.

— pressure and freezing point. *Arrhenius, S.* A. Ps. C. 51 (1894) 493-.

— — — and electric conductivity. *Reicher, L. T.* Mbl. Nt. (1888) 108-.

— — — of solutions. *Dieterici, C. A.* Ps. C. 52 (1894) 263-.

Partial and osmotic pressure of mixture of volatile liquids. *Guglielmo, G.* Rm. R. Ac. Line. Rd. 1 (1892) (Sem. 1) 242-.

Raoult's law of lowering of vapour pressure, theoretical explanation. *Donnan, F. G.* Ph. Mg. 34 (1892) 411-.

Salt solutions and attached water. *Guthrie, Fred. L.* Ps. S. P. 6 (1885) 169-; Ph. Mg. 18 (1884) 22-, 105-.

— raised to boiling point by steam at 100°. *Spence, P.* B. A. Kp. 39 (1869) (Sect.) 75-.

— — —. *Müller, F. C. G.* Berl. B. 9 (1876) 1629-.

— — —. *Wüllner, F.* H. A. A. Berl. B. 10 (1877) 256-.

— — —. *Buchanan, J.* Y. [1898] Sc. Met. S. J. 11 (1900) 42-.

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Solution of solids, rate. *Carbonelli, C. E.* Genova S. Lig. At. 3 (1892) 265-.

Solvent, rapid evaporation, particles of dissolved substance carried into atmosphere by. *Marquerite-Delacharlonny, P.* C. R. 103 (1886) 1128-.

Steam and brines, boiling mixtures. *Buchanan, J. Y.* [1898] Edinb. R. S. T. 39 (1900) 529-.

VAPOUR PRESSURE OF LIQUID MIXTURES.

Wüllner, A. A. Ps. C. 129 (1866) 353-.

Kononov, D. P. [1881-83] A. Ps. C. 14 (1881) 34-, 219-; (xii) Rs. Ps.-C. S. J. 16 (Pt. 1) (1884) 11-.

Jönsson, P. Lund. Un. Acta 24 (1887-88) (Mth.) No. ii, 16 pp.; 25 (1888-89) (Mth.) No. ii, 18 pp.; Föchr. Ps. (1887) (Ab. 2) 373-; (1888) (Ab. 2) 341.

Müller-Erzbach, W. Exner Rpm. 24 (1888) 575-.

Kahlbaum, G. W. A. Basel Vh. 9 (1893) 573-.

Müller, W. L., & Rosebrugh, T. R. [1897] Cn. I, P. 1 (1898) 87-.

Dolezalek, F. Z. Ps. C. 26 (1898) 321-.

Binary mixtures. *Magnus, G.* Pogg. A. 93 (1854) 579-.

—, *Duclaux, É.* A. C. 14 (1878) 305-; C. R. 86 (1878) 592-.

—, *Taylor, A. E.* J. Ps. C. 4 (1900) 290-, 355-, 675-.

—, *Zawidzki, J. von.* Z. Ps. C. 35 (1900) 129-.

— and ternary mixtures. *Schreinemakers, F. A. H.* Z. Ps. C. 35 (1900) 459-; Amst. Ak. Vs. 8 (1900) 704-; Amst. Ak. P. 3 (1901) 1-.

Carbon dioxide and sulphur dioxide. *Blümcke, A.* A. Ps. C. 34 (1888) 10-.

— — — — (Blümcke). *Pictet, R.* A. Ps. C. 34 (1888) 734-.

Maximum pressures. *Isambert, —.* C. R. 98 (1884) 1327-.

Mutually soluble mixtures. *Ostwald, W.* A. Ps. C. 63 (1897) 336-.

Ternary mixtures. *Ostwald, W.* Leip. Mth. Ps. Ab. 25 (1899) 411-.

—, *Schreinemakers, F. A. H.* Arch. Néerl. 5 (1900) 214-.

Volatile liquids. *Linebarger, C. E.* Am. C. S. J. 17 (1895) 615-, 690-.

Water, ice and freezing saline solution, relation between vapour pressures. *Ponsot, A. C.* R. 119 (1894) 731-.

— and sulphuric acid. *Kirchhoff, G.* Pogg. A. 104 (1858) 612-.

— — — (Kirchhoff). *Wüllner, A.* Pogg. A. 105 (1858) 478-.

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Babo, C. H. L. von. [1853-57] Freiburg B. 1 (1858) 18-, 277-.

Wüllner, A. Pogg. A. 103 (1858) 529-; 105 (1858) 85-.

(*Wüllner*.) *Kirchhoff, G.* Pogg. A. 106 (1859) 322-.

(*Kirchhoff*.) *Wüllner, A.* Pogg. A. 106 (1859) 632-.

- Pauchon, E. C. R. 89 (1879) 752-.
- Tammann, G. A. Ps. C. 24 (1885) 523-.
- Emden, R. A. Ps. C. 31 (1887) 145-.
- Tammann, G. St. Pét. Ac. Sc. Mm. 35 (1887) No. 9, 172 pp.; A. Ps. C. 36 (1889) 692-.
- (Tammann.) Emden, R. A. Ps. C. 38 (1889) 447-.
- Müller-Erbach, W. Z. Ps. C. 4 (1889) 1-.
- Ostwald, W. Humb. 8 (1889) 1-.
- Raoult, F. M. J. de Ps. 8 (1889) 5-.
- Charpy, G. C. R. 111 (1890) 102-.
- Evan, T., & Ormandy, W. R. C. S. J. 61 (1892) 769-.
- Dieterici, C. A. Ps. C. 50 (1893) 47-.
- Marchis, L. J. de Ps. 3 (1894) 193-, 257-.
- (tonometry.) Raoult, F. M. [1895] Isère S. Bil. 29 (1897) 139-.
- Wade, E. B. H. R. S. P. 62 (1898) 376-.
- Dieterici, C. A. Ps. C. 67 (1899) 859-.
- alcoholic. Kablukov, I. Ra. Ps.-C. S. J. 23 (C.) (1891) 388-; C. S. J. 64 (1893) (Abs., Pt. 2) 154-.
- dilute. Dieterici, C. A. Ps. C. 62 (1897) 616-.
- Smits, A. Amst. Ak. Vs. 8 (1900) 714-; Amst. Ak. P. 2 (1900) 635-.
- etheral. Raoult, F. M. As. Fr. C. R. (1888) (Pt. 2) 206-.
- ethyl ether. Jacobsen, I. P. N. Ts. Fs. K. 3 (1898) 288-; Fsch. Ps. (1898) (Ab. 2) 316.
- formic acid. Raoult, F. M. C. R. 122 (1896) 1175-.
- and freezing point, relation between. Koláček, F. [1881] A. Ps. C. 15 (1882) 38-.
- hydrates transparent on losing water. Tammann, G. A. Ps. C. 63 (1897) 16-.
- hydrocarbons and mixtures of benzene and toluene. Mangold, C. Wien Ak. Sb. 102 (1893) (Ab. 2a) 1071-.
- lowering, effect on molecular state of solvent. Waals, J. D. van der. Amst. Ak. Vs. 5 (1897) 342-; Fsch. Ps. (1897) (Ab. 2) 313-.
- mathematical theory. Ponsot, A. C. R. 123 (1896) 648-.
- maximum, and temperature. Julius, V. A. Amst. Ak. Vs. 5 (1897) 295-; Arch. Néerl. 1 (1898) 393-.
- and osmotic pressure. Raoult, F. M. C. R. 105 (1887) 857-.
- potassium hydrate solutions, table. Errera, G. Gz. C. It. 18 (1888) 225-.
- salt hydrates. Wüllner, A. Pogg. A. 110 (1860) 564-.
- , dissociating. Müller-Erbach, W. A. Ps. C. 23 (1884) 607-; 27 (1886) 623-; Wien Ak. Sb. 107 (1898) (Ab. 2a) 14-.
- sulphur. Combes, —. As. Fr. C. R. (1895) (Pt. 1) 237.
- and phosphorus, in carbon disulphide. Guglielmo, G. Rm. R. Ac. Linc. Rd. 1 (1892) (Sem. 2) 210-.
- sulphuric acid. Tate, T. (viii) Ph. Mg. 26 (1863) 502-.
- volatile substances. Lehfeldt, R. A. L. Ps. S. P. 16 (1899) 490-; Ph. Mg. 48 (1899) 215-.
- water in its compounds, also volume. Müller-Erbach, W. Exner Rpm. 23 (1887) 510-.
- from salt solutions. Nicol, W. W. J. Ph. Mg. 22 (1886) 502-.

1925 Solutions: Other Thermal Properties (Latent Heat). (See 1690.)

- Colloids, heat evolved in swelling and solution. Wiedemann, E., & Lüdeking, C. A. Ps. C. 25 (1885) 145-.
- Heat of dilution and specific heat of salt solutions. Arons, L. A. Ps. C. 25 (1885) 408-.
- Heats of solution, determination. Neumayr, E. [1877] Innsb. Nt. Md. B. 8 (1879) (Heft 1) 12-.
- — — and of mixtures. Tumlirz, O. Wien Ak. Sb. 104 (1895) (Ab. 2a) 245-.
- — — osmotic pressure, theory. Dieterici, C. A. Ps. C. 45 (1892) 207-, 589-.
- — — of salts. Scholz, R. A. Ps. C. 45 (1892) 193-.
- — — —. Tumlirz, O. Wien Ak. Sb. 102 (1893) (Ab. 2a) 888-.
- — — —, influence of temperature. Tilden, W. A. R. S. P. 38 (1885) 401-.
- Molecular heat. Wiedemann, E. E. G. A. Ps. C. 18 (1883) 608-.
- Salt solutions, formulae. Duhem, P. C. R. 104 (1887) 683-; Par. Éc. Norm. A. 4 (1887) 381-.
- — —, thermal properties. Favre, P. A. C. R. 77 (1873) 101-.
- — — —. Illingworth, B., & Howard, A. L. Ps. S. P. 6 (1885) 212-; Ph. Mg. 18 (1884) 123-.
- — — —. Saporta, A. de. As. Fr. C. R. (1897) (Pt. 2) 252-.
- — — —. Monnet, E. Bordeaux S. Sc. Mm. 3 (1899) 41-.
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- — — of solutions, and thermal effects at formation. Aleksyeev, V. T. [1883] (xii) Ra. Ps.-C. S. J. 16 (Pt. 1) (1884) 109-; Berl. B. 17 (1884) (Ref.) 193-.
- Theory. Kazankin, N. P. Kazan S. Ps.-Mth. Bil. 2 (1893) (Prot.) 13-.

1930 Dissociation. Allotropic Transformations.

- Gases, dissociated (ions), chemical action and relation to condensation. Richarz, —. Bonn Niedr. Gs. Sb. (1889) 51-.
- , dissociation. Threlfall, R. N. S. W. R. S. J. 20 (1887) 213-.
- , —. Jäger, G. Wien Ak. Sb. 100 (1891) (Ab. 2a) 1182-; 104 (1895) (Ab. 2a) 671-.
- , perfect, dissociation in mixture. Duhem, P. Lille Tr. Mm. 2 (1891-92) Mem. 8, 215 pp.
- Hydrates, dissociation tension. Andreae, J. L. Rot. N. Vh. 3 (1890) (St. 3) No. 2, 45 pp.
- of inorganic salts, dissociation. Frowein, P. C. F. Z. Ps. C. 1 (1887) 5-.
- Silver iodide, dimorphism. Mallard, E., & Le Chatelier, —. Par. S. Ps. Sé. (1885) 18-.

1940 Supersfusion

1940 Retardation Phenomena (Supersfusion, Superheating, Supersaturation).

"Fireless" steam-engine with soda boiler. *Bauer, A.* Oestr. Z. Brgw. 33 (1885) 31-, 51-, 78-, 108-, 141-, 152-, 174-, 181-, 206-, 219-, 232-, 249-, 265-.

Retardation of boiling and of congelation of liquids. *Artur, J. F.* C. R. 57 (1863) 92-.

SUPERFUSION.

- Desains, E.* L'I. 25 (1857) 257-; C. R. 54 (1862) 371-; A. C. 64 (1862) 419-.
- Gernez, D.* C. R. 63 (1866) 217-.
- Moutier, J.* Par. S. Phlm. Bil. 13 (1876) 5-.
- Tumltz, O.* Wien Ak. Sb. 100 (1891) (Ab. 2a) 1197-; 103 (1894) (Ab. 2a) 266-.
- Bachmetjev, P.* Rs. Ps.-C. S. J. 32 (Ps.) (1900) 218-; Fsch. Ps. (1900) (Ab. 2) 261-.
- Silver thaw. *Groves, T. B.* Met. S. QJ. 15 (1889) 253.
- Supersfused substances, solidification. *Moreschini, R.* Rm. R. Ac. Linc. Rd. 9 (1900) (Sem. 1) 13-.
- , —, rate. *Gernez, D.* Par. Éc. Norm. A. 1 (1884) 239-.
- , —, —. *Tammann, G.* Rs. Ps.-C. S. J. 29 (C.) (1897) 425-; Z. Ps. C. 23 (1897) 326-.
- , —, —. *Wilson, H. A.* [1898] Camb. Ph. S. P. 10 (1900) 25-.
- , —, —, and viscosity. *Wilson, H. A.* Ph. Mg. 50 (1900) 238-.
- , —, solubility. *Bruner, L.* C. R. 121 (1895) 59-.
- , —, specific heat. *Bruner, L.* C. R. 120 (1895) 912-.
- , —, —, calorimeter for. *Massol, G.* C. R. 130 (1900) 1126-.
- Supersfusion and supersaturation. *Gernez, D.* [1873] Par. Sé. S. Ps. 1 (1873-74) 88-.
- , —. *Bruner, L.* Kosmos (Lw.) 21 (1896) 95-.

SPECIFIED SUBSTANCES.

- Metals and alloys. *Roberts-Austen, W. C.* R. S. P. 63 (1898) 447-.
- Nitrotoluene, floating drops. *Bachmetjev, P.* St. Pét. Ac. Sc. Mm. 10 (1900) No. 7, 63 pp.
- Phosphorus, fluidity at common temperatures. *Faraday, M.* QJ. Sc. 2 (1827) 469-.
- , supersfusion and solidification. *Gernez, D.* C. R. 95 (1882) 1278-.
- Sulphur, fluidity at common temperatures. *Faraday, M.* QJ. Sc. 21 (1826) 392; (1827) (Pt. 2) 469-.
- , supersfused, solidification, and new variety of sulphur. *Gernez, —.* Par. S. Ps. Sé. (1884) 14-.
- , supersfusion and solidification. *Gernez, D.* C. R. 97 (1883) 1298-, 1366-, 1433-, 1477-.

Supersaturation 1940

- Supersfused salts, specific heat. *Bruner, L.* C. R. 121 (1895) 60-.
- Water. *Curtis, A. H.* Ph. Mg. 32 (1866) 422-.
- , *Krebs, G.* A. Ps. C. 146 (1872) 494-.
- , *Bordier, —.* Bordeaux S. Sc. Mm. 5 (1890) lxxxix-.
- , *Passy, J.* C. R. 122 (1896) 1409.
- , *Anon.* Sym. Met. Mg. 32 (1898) 1-.
- , crystals formed by release of pressure. *Amagat, E. H.* C. R. 117 (1893) 507-.
- , refractive index in state of supersfusion. *Damien, B. C.* J. de Ps. 10 (1881) 198-.
- , and salt solutions in motion. *Monti, V.* Tor. Ac. Sc. At. 27 (1892) 94-.

SUPERHEATING.

- Neyreneuf, —.* Caen Ac. Mm. (1893) (Pt. 1) 3-.
- crystalline, velocity of transformation of octahedral and prismatic sulphur. *Gernez, —.* Par. S. Ps. Sé. (1884) 79-.
- of liquids, efflux under strong pressure. *Nicoli, N.* Rm. R. Ac. Linc. Mm. 2 (1895) 108-.
- , mechanical stimulus to boiling. *Gernez, D.* C. R. 86 (1878) 1549-.
- , and supersaturation of vapours. *Nichols, E. L.* [1884] Kan. Ac. Sc. T. 9 (1885) 91-.
- , solutions, ebullition. *Walther-Meunier, H.* [1883] Mulhouse S. In. Bil. 55 (*1885) 113-.
- , evaporation. *Gernez, D.* A. C. 7 (1876) 113-.
- in steam boilers. *Fayol, H.* St. Ét. Bil. S. In. Mn. 13 (1884) 621-.
- and supersaturation, measurement. *Parenty, H.* C. R. 116 (1893) 867-.
- of water. *Donny, F.* (vi Add.) Majocchi A. Fis. C. 22 (1846) 264-.
- , *Dufour, L.* Sch. Nf. Gs. Vh. 48 (1864) 47-.

SUPERSATURATION.

- Lecoq de Boisbaudran, —.* C. R. 113 (1891) 832-.
- Martini, T.* Ven. I. At. (1892-93) 761-.
- of air with water vapour. *Schultheiss, —.* [1896] Karlsruhe Nt. Vr. Vh. 13 (1900) (Sb.) 29.
- dependence on crystalline form. *Nicol, K. W.* J. Edinb. R. S. P. 21 (1897) 473-.
- of liquids by their own vapour, objections. *Sanna-Solaro, —.* Les Mondes 26 (1871) 663-; 29 (1872) 451-.
- , —, —, —, — (Sanna-Solaro). *Tomlinson, C.* Les Mondes 27 (1872) 350-.
- , vapours, heat developed on partial liquefaction. *Olearski, K., & Silberstein, L.* [1897] Krk. Ak. (Mt.-Prz.) Bz. 13 (1898) 306-; Crc. Ac. Sc. Bil. (1897) 213.

SUPERSATURATED SOLUTIONS.

- Loewel, H.* C. R. 30 (1850) 163-; 32 (1851) 907-; 34 (1852) 642-; 35 (1852) 219-; 40 (1855) 481-; 1169-; 43 (1856) 709-; 44 (1857) 313-; 49 (1857) 32-.

- Gernez, D. C. R. 60 (1865) 1027-; 61 (1865) 71-, 289-, 847-.
- Jeannel, J. C. R. 61 (1865) 412-; A. C. 6 (1865) 166-.
- Viollette, C. [1865] (xii) Par. Éc. Norm. A. 3 (1866) 205-.
- Jeannel, J. C. R. 62 (1866) 37-.
- Lecoq de Boisbaudran, —. A. C. 9 (1866) 173-; C. R. 63 (1866) 95-.
- Schiff, H. N. Cim. 21 & 22 (*1865-66) 35-; A. Ps. C. 129 (1866) 292-.
- (Schiff.) Lindig, F. [1866] A. Ps. C. 130 (1867) 144-.
- Lecoq de Boisbaudran, —. C. R. 64 (1867) 1249-; 65 (1867) 111-; Par. Bil. S. C. 8 (1867) 3-, 65-; 9 (1868) 191-.
- Tomlinson, C. Phil. Trans. 158 (1868) 659-.
- Lecoq de Boisbaudran, —. A. C. 18 (1869) 246-; C. R. 68 (1869) 1329-; Par. Bil. S. C. 12 (1869) 33-.
- Margueritte, F. C. R. 68 (1869) 1329.
- Tomlinson, C. [1870] Phil. Trans. 161 (1871) 51-.
- Coppet, L. C. de. C. R. 73 (1871) 1324-.
- Liversidge, A. R. S. P. 20 (1872) 497-.
- Tomlinson, C. R. S. P. 21 (1873) 208-.
- Lecoq de Boisbaudran, P. E. C. R. 79 (1874) 802-.
- Gernez, D. C. R. 79 (1874) 912-.
- (Gernez.) Lecoq de Boisbaudran, P. E. C. R. 79 (1874) 1074-.
- Pelloggio, P. Mil. I. Lomb. Rd. 8 (1875) 607-.
- Grenfell, J. G. [1876-77] R. S. P. 25 (1877) 124-; Nt. 15 (1877) 138; (xii) Bristol Nt. S. P. 2 (1879) 130-.
- (Grenfell.) Tomlinson, C. [1877-78] R. S. P. 26 (1878) 523-; 27 (1878) 121-.
- (Tomlinson.) Grenfell, J. G. C. N. 39 (1879) 16-, 141-.
- Tomlinson, C. Nt. 20 (1879) 349-.
- Nicol, W. W. J. Ph. Mg. 20 (1885) 295-.
- Tomlinson, C. Ph. Mg. 21 (1886) 417-.
- Nicol, W. W. J. C. S. J. 51 (1887) 389-.
- Potyllicyn, A. [1889-92] Rs. Ps.-C. S. J. 21 (C.) (1889) 258-; C. S. J. 53 (1890) (Abs.) 333-; Vars. S. Nt. Tr. (1892-93) (C. R., Ps. C.) No. 3, 1-.
- action of isomorphs. Lecoq de Boisbaudran, P. E. C. R. 80 (1875) 888-.
- low temperatures. Tomlinson, C. Ph. Mg. 40 (1870) 295-.
- solids. Henrici, F. C. [1870] Freiburg B. 6 (1873) (Heft 1) 22-.
- — —. Tomlinson, C. R. S. P. 29 (1879) 24-.
- application of principle of unequal molecular conditions. Pfaunder, L. Wien Ak. Sb. 73 (1876) (Ab. 2) 574-.
- behaviour when exposed to open air. Tomlinson, C. R. S. P. 20 (1872) 41-.
- cause of solidification. Lieben, A. Wien SB. 12 (1854) 771-, 1087-.
- — —. Baumhauer, H. J. Pr. C. 104 (1868) 449-.
- and chemical constitution. Coppet, L. C. de. [1870-71] Laus. Bil. S. Vd. 10 (1868-70) 535-; 11 (1873) 7-.
- crystallisation. Gernez, D. C. R. 60 (1865) 833-; Par. Éc. Norm. A. 3 (1866) 167-; C. R. 61 (1865) 289-.
- Viollette, C. C. R. 76 (1873) 713-.
- Gernez, D. [1875-76] Par. Éc. Norm. A. 5 (1876) 9-; 7 (1878) 9-.
- Thomson, J. M. [1886] R. I. P. 11 (1887) 508-.
- density, specific heat and heat of dilution. Bindel, K. A. Ps. C. 40 (1890) 370-.
- and dissociation of dissolved salts. Sheerbachew, A. A. [1873] (xii) Rs. C. Ps. S. J. 6 (Pt. 1) (1874) 60-; (xi) St. Pét. Ac. Sc. Bil. 19 (1874) 42-.
- effect on crystals already formed. Gernez, D. Par. S. Philm. Bil. 1 (1877) 165-.
- formation of hydrates. Gernez, D. C. R. 84 (1877) 1389-.
- function of nuclei. Tomlinson, C. B. A. Rp. 38 (1868) (Sect.) 45-; C. N. 22 (1870) 97-, 109-, 265-.
- sides of vessel. Tomlinson, C. R. S. P. 27 (1878) 189-.
- nuclear action of crystal of same salt. Tomlinson, C. C. N. 22 (1870) 290-.
- and nuclei. Liversidge, A. C. N. 22 (1870) 90-, 97.
- oil as nucleus, and solid nuclei. Skey, W. N. Z. I. T. 12 (1880) 407-.
- phenomena, methods of utilising. Jeannel, J. C. R. 63 (1866) 606-.
- preparation. Coppet, L. C. de. [1869] Laus. Bil. S. Vd. 10 (1868-70) 145-.
- Potyllicyn, A. L. Rs. Ps.-C. S. J. 25 (C.) (1893) 73-; Berl. B. 26 (1893) (Ref.) 367-.
- and saturated solutions. Handl, A. Wien Sb. 66 (1872) (Ab. 2) 136-.
- solution. Dubrunfaut, —. C. R. 68 (1869) 916-, 1218-.
- surface tension of liquids, relation. Tomlinson, C., & Mensbrugghe, G. van der. C. R. 75 (1872) 254; R. S. P. 20 (1872) 342-.
- — — —, supposed relation (Tomlinson and van der Mensbrugghe). Gernez, D. C. R. 75 (1872) 1705-; 76 (1873) 566-.
- — — —, — (Gernez). Mensbrugghe, G. van der. C. R. 76 (1873) 45-.
- — — —, — (Tomlinson and van der Mensbrugghe). Viollette, C. C. R. 76 (1873) 171-.
- — — —, — (Gernez and van der Mensbrugghe). Coppet, L. C. de. C. R. 76 (1873) 434-.
- theory. Schiff, H. Lieb. A. 111 (1859) 68-.
- Jeannel, J. Bordeaux Mm. S. Sc. 4 (cah. 2) (1866) 8-.

Specified Substances.

- calcium sulphate. Potyllicyn, A. L. Rs. Ps.-C. S. J. 25 (C.) (1893) 201-; Berl. B. 26 (1893) (Ref.) 572.
- and zinc lactates. Coppet, L. C. de. [1869] Laus. Bil. S. Vd. 10 (1868-70) 493-.
- gases. Gernez, D. [1874-75] Par. Éc. Norm. A. 4 (1875) 311-; C. R. 80 (1875) 44-.

- gases, action of nuclei. *Tomlinson, C. Ph. Mg.* 43 (1872) 205-.
- , — solid bodies. *Tomlinson, C. Ph. Mg.* 45 (1873) 276-; 49 (1875) 302-.
- , distinction between physical and chemical phenomena. *Berthelot, —. C. R.* 131 (1900) 637-.
- oxygen. *Seyler, C. A. C. N.* 67 (1893) 67.
- sodium chloride. *Terreil, A. Par. S. C. Bil.* (1860) 233-.
- , *Coppet, L. C. de. C. R.* 74 (1872) 328-.
- perchlorate. *Potylicyn, A. L. Rs. Ps.-C. S. J.* 21 (C.) (1889) 258-; *C. S. J.* 58 (1890) (Abs.) 333-.
- sulphate. *Martini, T. Ven. I. At.* (1891-92) 583-.
- , action of low temperature. *Tomlinson, C. R. S. P.* 20 (1872) 109-.
- , — — — (Tomlinson). *Coppet, L. C. de. Arch. Sc. Ps. Nt.* 45 (1872) 173-.
- , — nuclei. *Tomlinson, C. R. S. P.* 29 (1879) 326-.
- , supposed nuclear action of weak solution. *Tomlinson, C. C. N.* 21 (1870) 52-.
- , temperature of spontaneous crystallisation. *Coppet, L. C. de. Par. Bil. S. C.* 17 (1872) 146-.
- , theory of solidification by contact with air. *Goskynski, —. C. R.* 32 (1851) 717-.
- sugar in alcohol. *Margueritte, F. C. R.* 68 (1869) 1110-.

THERMAL CONDUCTION AND CONVECTION.

2000 General.

(See also Chemistry 7240.)

- Air and water, thermal relations. *Mill, H. R. B. A. Rp.* (1893) 706.
- Bismuth in magnetic field, rotation of isothermal lines. *Righi, A. Rm. R. Ac. Line. Rd.* 3 (1887) (Sem. 2) 6-; *Rm. R. Ac. Line. Mm.* 4 (1887) 433-.
- Caloric, property of rising attributed to. *Hombres-Firmas, L. A. d'. Gard Aperçu Tr.* (1822) 97-.

CONDUCTION.

- Biot, J. B. J. Mines* 17 (1804) 203-.
- Stefan, J. Wien SB.* 47 (Ab. 2) (1863) 326-.
- Potier, A. J. de Ps.* 1 (1872) 145-, 217-.
- Grassi, G. Nap. I. Inc. At.* 1 (1882) No. 5, 5 pp.; *Nap. Rd.* 22 (1883) 121-.
- Puschl, C. Wien Ak. Sb.* 103 (1894) (Ab. 2a) 989-.
- Lauricella, G. Tor. Ac. Sc. At.* 33 (1897) 729- or 969-.
- Böckmann's researches. *Brandes, H. W. Gilbert A.* 47 (1814) 209-.
- comparison with that of electricity. *Decharme, C. Lum. Élect.* 13 (1884) 241-.

- and diffusion, application of curved rays. *Wiener, O. A. Ps. C.* 49 (1893) 105-.
- experiments. *Hagemann, G. A. I. CE. P.* 77 (1884) 311-.
- history of theory. *Riggenbach, A. Arch. Sc. Ps. Nt.* 12 (1884) 207-.
- influence of direction. *Sanctis, B. de. J. de Ps.* 72 (1811) 127-.
- by various means. *Rumford, B. (Count). Gilbert A.* 5 (1800) 288-.

- Conductivity, effect of pressure. *Lees, C. H. Manch. Lt. Ph. S. Mm. & P.* 43 (1900) No. 8, 6 pp.
- and emissivity, determination. *Eumorphopoulos, N. L. Ps. S. P.* 13 (1895) 327-; *Ph. Mg.* 39 (1895) 280-.
- , experiments. *Wachsmuth, R. A. Ps. C.* 48 (1893) 158-.
- and motion of ions. *Bredig, G. Stockh. Öfv.* (1895) 665-.
- thermoelectricity, theory. *Wiedeburg, O. A. Ps.* 1 (1900) 758-.
- of tissues. *Charrin, —, & Guillemonat, —. J. Pl. Pth. Gén.* 1 (1899) 325-.
- Dry vacuum, adiathermancy. *Arsonval, A. d'. Par. S. Bl. Mm.* 40 (1888) (C. R.) 136-.
- Earth temperature measurements (Königsberg), theoretical calculation. *Schmidt, A. Königsb. Schr.* 32 (1891) (Ab.) 97-.
- Equilibrium of temperature of bodies in contact. *Parnell, E. A. [1842] (vi Adds.) C. S. P.* (1843) 32.
- Gases, temperature, effect of contact with bodies of different temperature. *Koosen, J. H. Pogg. A.* 89 (1853) 437-.
- Gravitating masses, action of heat. *Crookes, W. [1873] (ix) Phil. Trans.* 164 (1874) 501-.
- Heat, flow, photographic impressions due to. *Guëbhard, A. C. R.* 125 (1897) 814-.
- , passage from colder to hotter body, impossibility. *Cellérier, C. Gen. S. Ps. Mm. Suppl.* (1891) No. 5, 15 pp.
- , — between metals and liquids in contact. *Stanton, T. E. [1897] Phil. Trans. (A)* 190 (1898) 67-.
- Hydrogen, cooling effects in cases of voltaic ignition. *Stevenson, W. F. R. S. P.* 5 (1849) 789.
- Insulation, effectiveness of arrangements for. *Hempel, W. A. Ps. C.* 68 (1899) 137-.
- against radiant heat, experiments. *Scheiner, J. Z. Instk.* 7 (1887) 271-.
- for steam boilers and pipes, comparison of substances. *Collins, W. H. B. A. Rp.* (1891) 780-.
- — pipes. *Russner, J. Dingler* 310 (1898) 4-.
- Plates, measurement of thickness by thermal method. *Lebasteur, —. C. R.* 99 (1884) 966-.
- Sodium pellet, spherical form assumed on water. *Pflaum, H. Riga Cor.-Bl.* 39 (1896) 106-.
- Sparked air, thermal properties. *Pettinelli, P. N. Cim.* 10 (1899) 117-.

- Surface condensers and steam boilers, efficiency. Stanton, T. E. Sc. Abs. 3 (1900) 497.
- heating, calorific transition resistance between metal and boiling water. Holborn, L., & Dittenberger, W. [1900] Sc. Abs. 4 (1901) 296.
- , new law. Ruhland, R. L. Schweigger J. 7 (1813) 432-; 18 (1816) 157-.
- Temperature variation of 2 neighbouring bodies. Morisot, —. Rv. Sc. 4 (1882) 499-.

2010 Mathematical Analysis and Applications (Fourier).

- Kelland, P. B. A. Rp. (1840) (pt. 2) 15-; (1841) 1-.
- Thomson, (Sir) W. Camb. Mth. J. 4 (1845) 67-.
- Mollison, W. L. Mess. Mth. 10 (1881) 170-.
- Analytical researches on Thoulet's method. Lagarde, H. A. C. 26 (1882) 552-.
- theory. Biot, J. B. Par. S. Phlm. Bll. 3 (1804) 215-.
- , Fourier, J. B. J. [1807-28] Par. S. Phlm. N. Bll. 1 (1807) 112-; Par. Mm. Ac. Sc. 4 (1824) 185-; 5 (1826) 153-; 8 (1829) 581-.
- , Lejeune-Dirichlet, G. Crelle J. 5 (1829) 287-.
- , Liouville, J. [1830] Gergonne A. Mth. 21 (1830-31) 133-.
- , Poisson, S. D. Crelle J. 12 (1834) 258-; A. C. 59 (1835) 71-.
- , Colnet d'Huart, — de. [1866] Lux. S. Sc. Mm. 9 (1867) 48-.
- , Poincaré, H. C. R. 104 (1887) 1753-; 107 (1888) 967-.
- , Sommerfeld, A. Mth. A. 45 (1894) 263-.
- , Fourier's. Resal, H. A. Liouv. J. Mth. 8 (1882) 79-.
- , problem. Stekloff, W. C. R. 126 (1898) 1022-.
- , problems. Rudzkiy, M. N. Rs. S. Nt. Mm. (Mth.) 11 (1890) 123-; Fsch. Ps. (1890) (Ab. 2) 378-.
- Atmospheric temperature from cooling thermometer. Dufour, C. [1864] C. R. 59 (1864) 1007-; Laus. Bll. S. Vd. 8 (1864-65) 215-.
- Attraction and heat. Heine, H. E. Crelle J. 29 (1845) 185-.
- , (Heine). Jacobi, C. G. J. Crelle J. 42 (1851) 35-.
- , —, Amster, J. Crelle J. 42 (1851) 316-.
- , —, 2 general theorems. Chasles, M. C. R. 8 (1839) 209-.
- Conduction in bars. Forbes, J. D. [1862] Edinb. R. S. T. 23 (1864) 133-.
- crystallised homogeneous media. Morin, P. C. R. 66 (1868) 1332-.
- crystals. Duhamel, J. M. C. C. R. 25 (1847) 870-; Par. Éc. Pol. J. 32^e cah. (1848) 155-.
- , —, Duhamel, A. C. R. 27 (1848) 129-.
- , —, Stokes, G. G. Camb. and Dubl. Mth. J. 6 (1851) 215-.
- Earth. Brioschi, F. Mil. G. I. Lomb. 1 (1847) 295-.

- Conduction in Earth's crust. Schubert, J. Ps. Z. 1 (1900) 442-.
- and electrostatic influences of galvanic current, analogy. Rees, R. van. Amst. Vs. Ak. 15 (1863) 428-.
- in flowing liquid. Šebuev, G. N. Kazan S. Ps.-Mth. Bll. 2 (1893) 64-, 173-; Fsch. Mth. (1892) 908.
- fluids, compressible or incompressible. Neumann, C. Leip. Mth. Ps. B. 46 (1894) 1-.
- generalathermanous medium. Boussinesq, J. C. R. 69 (1869) 329-.
- liquids, historical treatment. Chree, C. Ph. Mg. 24 (1887) 1-.
- moist earth. Sundell, A. F. Helsingf. Öfv. 40 (1898) 152-.
- from point in homogeneous dissymmetric medium, spirals. Boussinesq, J. C. R. 66 (1868) 1194-.
- , —, isothermals and lines of flow in. Boussinesq, J. Liouv. J. Mth. 14 (1869) 265-.
- and polarisation stress in gases. Stoney, G. J. B. A. Rp. (1879) 256-.
- , resistance. Rankine, W. J. M. Ph. Mg. 23 (1862) 336.
- in solids, laws. Amster, J. Crelle J. 42 (1852) 327-.
- , —, theory. Harnack, A. Dresden Isis Festschr. (1885) 147-; Z. Mth. Ps. 32 (1887) 91-.
- uniaxial crystals. Lang, V. von. Wien Sb. 54 (1866) (Ab. 2) 163-.
- Conductivity, thermal. Tait, P. G. [1878] Edinb. R. S. T. 28 (1879) 717-.
- , —, and plane heat waves. Tait, P. G. [1881] Edinb. R. S. P. 11 (1882) 126-.
- Conjugate points. Young, J. R. Ph. Mg. 27 (1845) 91-.
- (Young). Warner, H. S. Ph. Mg. 29 (1846) 83-.
- Cooling, law, and conduction. Lees, C. H. Ph. Mg. 28 (1889) 429-.
- of wall by radiation. Boussinesq, J. C. R. 130 (1900) 1731-.
- Dynamical equivalence of problems of stationary temperatures, torsion and flow in pipes. Boussinesq, J. Liouv. J. Mth. 6 (1880) 177-.
- Earth, theory of secular cooling. Rudzkiy, M. P. N. Rs. S. Nt. Mm. (Mth.) 14 (1892) 83-; 15 (1893) 1-.
- Earth's crust, cooling. Boussinesq, J. C. R. 130 (1900) 1652-.
- heat as influenced by conduction and pressure. Irving, (Rev.) A. B. A. Rp. (1886) 657-.
- Equation of conduction. Ostrogradsky, M. A. [1836] St. Pét. Ac. Sc. Bll. 1 (1836) 25-; St. Pét. Ac. Sc. Mm. 3 (Sc. Mth. Ps., pte. 1) (1838) 353-.
- , —, Boulanger, A. Par. S. Mth. Bll. 25 (1897) 11-.
- , —, molotropic. Duhamel, J. M. C. Par. Éc. Pol. J. 21^e cah. (1832) 356-.
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- — — *Andrews, T.* R. S. P. 40 (1886) 544-.
- — — *Mitchell, A. C.* Edinb. R. S. P. 13 (1886) 592-.
- — — *Straneo, P.* Rm. R. Ac. Linc. Rd. 6 (1897) (Sem. 2) 262-, 299-.
- Iron. *Pazienti, A.* Ven. At. 10 (1864-65) 458-.
- — — *Tait, P. G.* B. A. Rp. 39 (1869) 175-.
- — — *Hansemann, G., & Kirchhoff, G.* A. Ps. C. 9 (1880) 1-.
- — — *Hall, E. H.* Ps. Rv. 10 (1900) 277-.
- — — bar, rate of conduction in. *Decharme, C. J.* [1876] (xii) M.-et-L. S. Ac. Mm. 34 (1878) 1-, 126; (ix) C. R. 82 (1876) 731-, 815-.
- — — cast. *Osmond, I. T.* Ps. Rv. 2 (1895) 211-.
- — — *Hall, E. H., & Ayres, C. H.* Am. Ac. P. 34 (1899) 281-.

- Iron, cast, and nickel, cast. *Hall, E. H.* Am. Ac. P. 27 (1893) 262-.
- , conductance as function of magnetisation. *Schweitzer, A.* Zür. Ps. Gs. Jbr. (1899 & 1900) 13.
- and copper. *Stewart, R. W.* [1893] Phil. Trans. (A) 184 (1894) 569-.
- — and German silver. *Mitchell, A. C.* Edinb. R. S. T. 33 (1888) 535-.
- — German silver. *Weber, Hein.* A. Ps. C. 146 (1872) 257-.
- , influence of magnetism on conductance. *Maggi, P. G.* Bb. Un. Arch. 14 (1850) 132-.
- — — — —. *Bellati, M., & Naccari, A.* [1876] Ven. I. At. 3 (1877) 83-.
- — — — —. *Penrose, C. B., & Trowbridge, J.* Am. Ac. P. 13 (1883) 210-.
- — — — —. *Battelli, A.* Tor. Ac. Sc. At. 21 (1885) 799-.
- — — — —. *Fossati, E.* Rv. Sc.-Ind. 21 (1889) 6-, 17-, 42-.
- — — — —. *Korda, D.* [1899] C. R. 128 (1899) 418-, 575; Mth. Termt. Éts. 17 (1899) 169-; Mth. Nt. B. Ung. 17 (1901) 313-.
- , magnetic. *Holmgren, K. A.* Stockh. Öfv. 19 (1862) 163-.
- and steel, influence of magnetism on conductance. *Tomlinson, H. R. S. P.* 27 (1878) 109-.
- — —, thermal and electric conductance. *Schulze, F. A.* A. Ps. C. 63 (1897) 23-.
- , thermal and electric conductance. *Hall, E. H.* [1900] Am. Ac. P. 36 (1901) 119-.
- , wrought. *Forbes, J. D.* [1865] Edinb. R. S. T. 24 (1867) 73-.
- Isomorphous bodies, conduction in. *Godard, L.* C. R. 102 (1886) 1233-.
- Lead, bismuth and Wood's alloy. *Kronauer, H.* Zür. Vjschr. 25 (1880) 257-.
- Magnesium carbonate as non-conductor. *Luttgen, E.* Am. I. Mn. E. T. 15 (1887) 614-.
- Marble and slate, conductance, temperature variation. *Peirce, B. O., & Willson, R. W.* Am. J. Sc. 50 (1895) 435-.
- Marbles. *Peirce, B. O., & Willson, R. W.* [1900] Am. Ac. P. 36 (1901) 11-.
- Mercury and other metals. *Berget, A.* Par. S. Ps. Sé. (1888) 335-.
- Metal bar. *Dumas, W. A.* Ps. C. 129 (1866) 272-, 393-.
- , conduction in. *Kleiner, A.* Arch. Sc. Ps. Nt. 28 (1892) 353-.
- — —, lecture apparatus. *Campbell, G.* Rm. R. Ac. Linc. Mm. 13 (1882) 124-.
- wires. *Poloni, G.* Mil. I. Lomb. Rd. 19 (1886) 654-.
- Metals. [*Péclet, non*] *Peilet, E.* C. R. 8 (1839) 627-; A. C. 2 (1841) 107-.
- , *Franz, R., & Wiedemann, G. H.* Pogg. A. 89 (1853) 497-.
- , *Mousson, A.* Sch. Gs. Vh. 50 (1866) 55-.
- , *Brit. Ass. Comm.* B. A. Rp. 39 (1869) 175-.
- , *Deny, É.* [1881] (xii) Metz Ac. Mm. 63 (1885) 379-.
- Metals. *Poloni, G.* Mil. I. Lomb. Rd. 15 (1882) 386-.
- , *Chvolson, O. D.* Rs. Ps.-C. S. J. 19 (Ps.) (1887) 439-.
- , *Berget, A.* C. R. 107 (1888) 227-.
- , *Gezechus [Hesekus], N.* Rs. Ps.-C. S. J. 24 (Ps.) (1892) 153-; J. de Ps. 2 (1893) 528.
- , *Gray, J. H.* [1894] Phil. Trans. (A) 186 (1896) 165-.
- , *Edser, E.* Nt. 60 (1899) 244-.
- and alloys. *Johnson, R., & Crace-Calvert, F. C. R.* 47 (1858) 1069-; Phil. Trans. (1858) 349-.
- , conduction in. *Gore, G.* Ph. Mg. 6 (1853) 382-.
- — —. *Wiedemann, G.* Pogg. A. 95 (1855) 337-.
- — —. *Olivier, J.* (xii) Vauc. Ac. Mm. 1 (1882) 156-.
- and earthy substances. *Despretz, C.* A. C. 36 (1827) 422-.
- , effect of temperature on conductance. *Lenz, R.* [1869-70] St. Pét. Ac. Sc. Bll. 14 (1870) 54-; St. Pet. Ac. Sc. Mm. (Rs.) 16 (*1870) (App. No. 2) 63 pp.
- , especially platinum. *Fischer, N. W.* Pogg. A. 19 (1830) 507-.
- , thermal conductance, variation with temperature. *Lodge, O. J.* Ph. Mg. 7 (1879) 198-, 251-; 8 (1879) 510-; L. Ps. S. P. 3 (1880) 28-, 141-.
- , — and electric conductance. *Hansemann, G., & Kirchhoff, G.* A. Ps. C. 13 (1881) 406-.
- — — — —. *Lorenz, L.* [1881] Kjøb. Dn. Vd. Selsk. Skr. 2 (*1881-86) 35-; A. Ps. C. 13 (1881) 422-, 582-.
- — — — —. *Berget, A.* J. de Ps. 9 (1890) 135-.
- — — — —. *Straneo, P.* Rm. R. Ac. Linc. Rd. 7 (1898) (Sem. 1) 197-, 310-.
- — — — —. *Aubel, E. van.* D. Ps. Gs. Vh. (1900) 3-.
- — — — — (van Aubel). *Jäger, W., & Diesselhorst, H.* D. Ps. Gs. Vh. (1900) 39-.
- — — — — (Jäger and Diesselhorst). *Aubel, E. van.* D. Ps. Gs. Vh. (1900) 77-.
- — — — —. *Riecke, E.* A. Ps. 2 (1900) 835-; Gött. Nr. (1900) 250-.
- — — — —. *Grüneisen, E.* A. Ps. 3 (1900) 43-.
- — — — — on electron theory. *Reinganum, M.* A. Ps. 2 (1900) 398-.
- — — — —, heat capacity and thermoelectric power. *Jaeger, W., & Diesselhorst, H.* Berl. Ak. Sb. (1899) 719-; Berl. Ps. Reichsanst. Ab. 3 (1900) 269-.
- Minerals, etc., conductance, measurement. *Jannettaz, É.* Par. S. Ps. Sé. (1885) 6.
- , fibrous. *Jannettaz, É.* Par. S. Gl. Bll. 6 (1878) 208-.
- and rocks. *Thoulet, J.* A. C. 20 (1880) 362-; C. R. 94 (1882) 1047-; A. C. 26 (1882) 261-.
- Nickel. *Baillie, T. C.* Edinb. R. S. T. 39 (1900) 361-.

2020 *Specifica Solids*

- Non-isotropic bodies, conduction in, lecture experiment. *Sella, A. N. Cim.* 10 (1899) 186-.
- Organic substances, conduction in. *Greiss, C. B. A. Ps. C.* 139 (1870) 174-.
- Phosphor-copper and arsen-copper, thermal and electric conductivity. *Rietzsch, A. A. Ps.* 3 (1900) 403-.
- Plates, conduction in, from hot gases to water. *Halliday, G.* [1898] *Glasg. I. Eng. T.* 42 (1899) 41-.
- with variously arranged surfaces, conduction in. *Walker, W. G. Elect.* 35 (1895) 788-.
- Porous moist substances. *Andrée, S. A.* [1890] *Stockh. Ak. Hndl. Bh.* 16 (*Afd.* 1) (1891) No. 7, 7 pp.; *Fachr. Ps.* (1890) (*Ab.* 2) 381.
- Rocks. *Herschel, A. S. B. A. Rp.* 43 (1873) (*Seet.*) 40.
- (St. Gothard). *Weber, R. H. Neuch. S. Sc. Bll.* 12 (1880) 687-.
- *Prestwich, J.* [1885] *R. S. P.* 41 (1887) 1-.
- *Stadler, G. Zür. Vjschr.* 34 (1889) 12-.
- , conduction, temperature variation. *Forbes, J. D. B. A. Rp.* (1840) 434-.
- , —, —. *Kelvin, (Lord), & Murray, J. R. E. R. S. P.* 58 (1895) 162-.
- , —, —. *Weber, R. Nt.* 52 (1895) 458-.
- , —, —. *Peirce, B. O., & Willson, R. W.* [1895] *Nt.* 53 (1895-96) 4.
- (Campagna), external and internal conductance. *Morano, F. Rm. B. Ac. Linc. Rd.* 7 (1898) (*Sem.* 2) 61-, 83-, 357.
- and solids in general. *Jannettaz, É. C.* *B.* 78 (1874) 1202-.
- Salts. *Lees, C. H. Manch. Lt. Ph. S. Mm.* & *P.* 42 (1898) No. 5, 4 pp.
- Selenium, action of light. *Bellati, M., & Lussana, S. Ven. I. At.* (1886-87) 1117-.
- Snow. *Hjeltström, S. A. Stockh. Öfv.* (1889) 669-; *J. de Ps.* 10 (1891) 142-.
- Soils. *Forbes, J. D. Edinb. R. S. P.* 1 (1845) 343-.
- Steam-pipes, non-conducting coverings for. *Ordway, J. M. Franklin I. J.* 86 (1883) 411-.
- Steel, manganese-. *Mitchell, A. C. Edinb. R. S. T.* 35 (1890) 947-.
- , mild. *Hall, E. H. Am. Ac. P.* 31 (1896) 271-.
- , — and hard. *Kohlrausch, F. Würzb. Ps. Md. Sb.* (1887) 120-.
- plates, conduction in. *Blechynden, A. Nv. Archt. T.* 35 (1894) 70-.
- Stones. *Perry, J., & Ayrton, W. E. Ph. Mg.* 5 (1878) 241-.
- *Peirce, B. O., & Willson, R. W. Am. Ac. P.* 34 (1899) 1-.
- Tourmaline. *Senarmont, H. de. A. C.* 28 (1850) 279.
- *Stenger, F. A. Ps. C.* 22 (1884) 522-.
- Tube plates, conduction through. *Durston, A. J. Nv. Archt. T.* 34 (1893) 130-.
- Vulcanite. *Peirce, B. O. Am. Ac. P.* 35 (1900) 73-; *Ph. Mg.* 49 (1900) 15-.
- Walls, conduction in. *Ferrini, R. Mil. I. Lomb. Rd.* 31 (1898) 479-.

Heat Conductance of Liquids 2030

- Walls, conduction of solar heat in. *Provenzali, F. S. Rm. N. Linc. At.* 34 (1881) 143-.
- of cylinders of steam-engines, conduction in. *Henrotte, J., & Yssel de Schepper, J. H. A. Rv. Un. Mines* 6 (1889) 40-, 129-.
- safes, resistance to passage of heat. *Ruff, F. Dingler* 300 (1896) 173-.
- , —, —, —. *Rusener, —. Dingler* 301 (1896) 95-.
- Wire heated equally at ends, steady state. *Hearn, G. W. Ph. Mg.* 29 (1846) 22-.
- Wood. *Hoh, T. (xii) Bamb. Nf. Gs. B.* (11) (1876) (*Pt. 1, No. 3*) 17 pp.
- , æolotropic conductance. *Decandolle, A., & De la Rive, A. Gen. Mm. S. Ps.* 4 (1828) 70-.
- , —, —. *Tyndall, J. B. A. Rp.* (1852) (*pt.* 2) 20.
- and stone. *Less, E.* [1877] *A. Ps. C. (Ergänz.)* 8 (1878) 517-.

2030 Liquids, Conductance of.

- Dalton, J.* [1799] *Manch. Ph. S. Mm.* 5 (1802) 373-.
- Nicholson, W. Nicholson J.* 5 (1802) 197-.
- Murray, (Dr.) J. Nicholson J.* 1 (1802) 165-, 241-.
- Traill, T. S. Nicholson J.* 12 (1805) 133-.
- Böckmann, C. W. Rot. N. Vh.* 6 (1827) 1-.
- Despretz, C. C. R.* 8 (1839) 879-.
- Guthrie, Fred.* [1868] *Phil. Trans.* 159 (1869) 637-.
- Paalzow, A. A. Ps. C.* 134 (1868) 618-.
- Despretz, C. C. R.* 72 (1871) 484-.
- Winkelmann, A. A. A. Ps. C.* 153 (1874) 481-.
- Beetz, W. Münch. Ak. Sb.* 9 (1879) 86-.
- Baumgartner, G. Carl Rpm.* 17 (1881) 586-.
- Graetz, L.* [1882-85] *A. Ps. C.* 18 (1883) 79-; 25 (1885) 337-.
- Weber, H. F. Berl. Ak. Sb.* (1885) 809-.
- Apparatus. Evans, W. P.* [1898] *N. Z. I. T.* 31 (1899) 555-.
- Conductance in solid and liquid states. *Sluginov, N. Rs. Ps.-C. S. J.* 23 (*Ps.*) (1891) 456-; *J. de Ps.* 1 (1892) 405-.

CONDUCTION IN LIQUIDS.

- Thomson, T. Nicholson J.* 4 (1801) 529-.
- Rumford, B. (Count). Nicholson J.* 14 (1806) 353-.
- Prevost, P. J. de Ps.* 72 (1811) 168-.
- Fourier, J. B. J.* [1820] *Par. Mm. Ac. Sc.* 12 (1833) 507-.
- Despretz, C. C. R.* 7 (1838) 933-; 8 (1839) 838-; *A. C.* 71 (1839) 206-.
- Guthrie, Fred. Ph. Mg.* 35 (1868) 283-.
- Paalzow, —. D. Nf. Tbl.* (*1868) 170-.
- Weber, H. F. Zür. Vjschr.* 24 (1879) 252-, 355-.
- (Weber.) *Winkelmann, A. A. A. Ps. C.* 10 (1880) 668-.
- (Winkelmann.) *Weber, H. F. A. Ps. C.* 11 (1880) 347-.
- (Weber.) *Winkelmann, A. A. A. Ps. C.* 11 (1880) 734-.
- Chree, C. R. S. P.* 43 (1888) 30-.

- Kristensen, K. S.* Ts. Ps. C. 31 (1892) 97-
with convection. *Oberbeck, A.* A. Ps. C.
7 (1879) 271-
in motion. *Duhamel, J. M. C.* C. R. 47 (1858)
5-, 129-, 175-
—, *Šebuev, G.* Kazan S. Ps.-Mth. Bil.
1 (1891) 22-.

- Mixtures and their constituents. *Lees, C. H.*
[1895-99] B. A. Rp. (1895) 628; L. Ps. S. P.
17 (1901) 73-; Ph. Mg. 49 (1900) 286-
Temperature variation. *Lees, C. H.* [1897]
Phil. Trans. (A) 191 (1898) 399-.

SPECIFIED LIQUIDS.

- Mercury. *Gripou, É.* [1866] C. R. 63 (1866)
51-; (xn) Lille S. Mm. 3 (1867) 179-
—, *Herwig, H.* [1873-80] A. Ps. C. 151
(1874) 177-; 10 (1880) 662-
— (Herwig). *Weber, H. F.* A. Ps. C. 11
(1880) 345-
—, *Berget, A.* C. R. 105 (1887) 224-; 106
(1888) 1152-; 107 (1888) 171-; Par. S. Ps.
Sé. (1888) 335-
— and amalgams. *Johnson, R., & Crace-
Calvert, F.* Phil. Trans. (1859) 831-
Organic liquids. *Heen, P. de.* Brux. Ac. Bil.
18 (1889) 192-
Saline solutions. *Jäger, G.* Wien Ak. Sb.
99 (1891) (Ab. 2a) 245-
Water. *Bottomley, J. T.* [1879] Phil. Trans.
172 (1881) 537-
—, *Milner, S. R., & Chattock, A. P.* [1898]
Ph. Mg. 48 (1899) 46-
— and alcohol mixtures. *Henneberg, H.* A.
Ps. C. 36 (1889) 146-
—, conductance, and conduction in system of
cylinders. *Lorberg, H.* A. Ps. C. 14 (1881)
291-, 426-
— heated at the top in stone boiler. *Horn-
blower, J. C.* Nicholson J. 8 (1804) 169-
— as non-conductor. *Mather, W. W.* Silliman
J. 13 (1828) 368-
—, warming in tubes. *Forchheimer, P.* Hann.
Arch. -Vr. Z. 34 (1888) 175-; 35 (1889) 609-.

2035 Gases, Conductance of.

- Mohr, C. F.* Bonn SB. Niedr. Gs. (1869) 196;
Z. Mth. Ps. 15 (1870) 269-
(Mohr.) *Clausius, R.* D. C. Gs. B. 4 (1871)
269-
Ronkar, E. Brux. Ac. Bil. 8 (1884) 204-
Smoluchowski, M. Prace Mt.-Fiz. 10 (1899-
1900) 33-
Apparatus. *Kundt, A.* A. Ps. C. 2 (1877) 384-
—, *Wood, R. W.* Ps. Rv. 6 (1898) 165-
Conductance at low temperatures. *Eckerlein,
P. A.* A. Ps. 3 (1900) 120-.

CONDUCTION IN GASES.

- Fourier, J. B. J.* [1820] Par. Mm. Ac. Sc.
12 (1833) 507-
Magnus, G. Berl. Mb. (1860) 485-
Clausius, R. Pogg. A. 115 (1862) 1-.

- Stefan, J.* [1872-75] Wien Sb. 65 (1872)
(Ab. 2) 45-; 72 (1876) (Ab. 2) 69-
Boltzmann, L. [1875] Wien Ak. Sb. 72 (Ab.
2) (1876) 458-
Winkelmann, A. A. A. Ps. C. 156 (1875) 497-;
157 (1876) 497-
Schleiermacher, A. A. Ps. C. 34 (1888) 623-
Winkelmann, A. A. Ps. C. 44 (1891) 177-;
429-
Graetz, L. A. Ps. C. 45 (1892) 298-
(Graetz.) *Winkelmann, A.* A. Ps. C. 46 (1892)
323-
Weber, L. [1894] Schl.-Holst. Nt. Vr. Schr.
10 (1895) 313.
effect of density. *Winkelmann, A. A.* A. Ps.
C. 11 (1880) 474-
— — temperature. *Winkelmann, A. A.* A.
Ps. C. 19 (1883) 649-; 29 (1886) 68-
— —, *Eichhorn, W.* A. Ps. C. 40 (1890)
697-
at high temperatures. *Winkelmann, A. D.*
Nf. Tbl. (*1879) 181.
rarefied. *Smoluchowski, M. (Ritter) von Smolan.*
A. Ps. C. 64 (1898) 101-; Ph. Mg. 46 (1898)
192-
—, *Gehrcke, E.* A. Ps. 2 (1900) 102-
—, and friction. *Kundt, A., & Warburg, E.*
A. Ps. C. 155 (1875) 337-, 525-; 156 (1875)
177-
and vapours. *Winkelmann, A. A.* A. Ps. C.
159 (1876) 177-.

- Mixtures. *Plank, J.* [1875] Wien Ak. Sb.
72 (1876) (Ab. 2) 269-
Temperature variation. *Graetz, L.* A. Ps. C.
14 (1881) 232-
— (Graetz). *Winkelmann, A. A.* A. Ps. C.
14 (1881) 534-
— (Winkelmann). *Graetz, L.* A. Ps. C.
14 (1881) 541-
Vapours, temperature and pressure variations.
Magnanini, G., & Zunino, V. Mod. Ac. Sc.
Mm. 2 (1900) 87-.

SPECIFIED GASES.

- Air (rarefied). *Crookes, W.* [1880] R. S. P.
31 (1881) 239-
—, *Winkelmann, A.* A. Ps. C. 48 (1893)
180-
—, *Müller, E.* A. Ps. C. 60 (1897) 82-
— and hydrogen. *Buff, H.* A. Ps. C. 158
(1876) 177-; Berl. Ak. Mb. (1876) 89; Arch.
Sc. Ps. Nt. 57 (1876) 293-
— —, temperature coefficient. *Winkelmann,
A. A.* A. Ps. C. 1 (1877) 63-
—, temperature variation. *Müller, E.* [1900]
Ps. Z. 2 (1901) 161-
—, use as bad conductor. *Bodde, B.* Herm-
stadt Bil. 9 (1811) 161-
Mercury vapour. *Schleiermacher, A.* A. Ps.
C. 36 (1889) 346-
Nitrogen, nitric oxide, ammonia and illumina-
ting gas. *Plank, J.* [1876] Wien Ak. Sb.
74 (1877) (Ab. 2) 215-.

2040 Convection. Laws of Cooling. (See 4210.)

CONVECTION.

- Rumford, B. (Count).* Nicholson J. 1 (1797) 289-, 341-, 563-; Gilbert A. 1 (1799) 214-, 323-; 2 (1799) 249-.
- (*Rumford.*) *De Luc, G. A.* (vi *Adds.*) Gilbert A. 1 (1799) 464-.
- (—) *Biot, J. B.* Par. S. Phlm. Bll. 3 (1801) 36-.
- (—) *Parrot, G. F.* Gilbert A. 17 (1804) 257-, 369-; 22 (1806) 148-.
- Air currents, ascending and descending, temperature differences. *Richarz, F. D. Nf. Vh.* (1900) (*Th.* 2, *Hälfte* 1) 21-.
- in mines, resistance to. *Elwen, T. L.* [1889] N. Eng. I. Mn. E. T. 38 (1891) 205-.
- — — — — *Murgue, D.* [1893-94] Fed. I. Mn. E. T. 6 (1894) 135-, 418-; 7 (1894) 211-.
- — — — — *Elwen, T. L.* [1895] N. Eng. I. Mn. E. T. 45 (1896) 62-.
- and other gases, flow. *Gordon, F. W.* [1885] Am. I. Mn. E. T. 14 (1886) 146-.
- , hot, ascent through tubes. *Anon.* (vi 1063) QJ. Sc. (1829) (*Pt.* 1) 179.
- , —, flow in pipes. *Schreiber, F.* Karsten Arch. 12 (1839) 121-.
- Cellular vortices in liquid. *Bénard, H.* Par. S. Ps. Sé. (1900) 213-.
- Chimney draught. *Avit, —.* Le Pay A. S. Ag. (1828) 215-.
- , *Förster, C. F. L.* Förster Al. Bauztg. 22 (1857) 88-.
- , supposed effect of sunlight. *Kohlrausch, F.* Würzb. Ps. Md. Sb. (1881) 151-.
- , thermodynamics. *Frazier, B. W.* Am. I. Mn. E. T. 10 (*1882) 249-.
- Chimneys, factory. *Cordier, E.* St. Ét. Bll. S. In. Mn. 2 (1888) 535-.
- Circulation in atmosphere, dynamics. *Bjerknes, V.* [1899] Met. Z. 17 (1900) 97-, 145-.
- hot water pipes, theory. *Riccd, A.* Palermo G. Sc. Nt. 17 (1886) 9-.
- tubular boilers. *Brillié, H.* Gén. Civ. 32 (1897-98) 75-, 95-, 114-, 264-, 282, 297-, 313-; 34 (1898-99) 134-, 147-, 165-, 181-, 195-; 35 (1899) 342-, 357-, 378-, 388-, 405-.
- vertical glass tubes. *Dutrochet, H.* A. C. 48 (1831) 268-.
- Convection by air currents. *Mitchell, A. C.* [1899] Edinb. R. S. T. 40 (1905) 39-.
- in air, fundamental formula. *Käuffer, P.* Carl Rpm. 18 (1882) 200-.
- and conduction in flowing liquids. *Šebuev, G.* Kazan S. Ps.-Mth. Bll. 1 (1891) 22-.
- currents. *Richarz, F., & Lonnes, C. Z.* Ps. C. 20 (1896) 145-.
- in air and liquids. *Czermak, P.* A. Ps. C. 50 (1893) 329-.
- — liquid. *Parrot, G. F.* Gilbert A. 19 (1805) 453-.

- Convection currents in liquid. *Oberbeck, A.* A. Ps. C. 11 (1880) 489-.
- — — — — steady motion; vortices. *Bénard, H.* C. R. 130 (1900) 1004-, 1065-; Par. S. Ps. Sé. (1900) 202-.
- — — — — melted wax. *Tomlinson, C. B. A.* Rp. 36 (1866) (*Sept.*) 44-.
- —, supposed. *Thomson, T.* Nicholson J. 1 (1802) 81-.
- , diffusive. *Griffiths, A. L.* Ps. S. P. 16 (1899) 230-; Ph. Mg. 46 (1898) 453-.
- , —, source of energy. *Griffiths, A. L.* Ps. S. P. 16 (1899) 435-; Ph. Mg. 47 (1899) 522-.
- in gas. *Lorentz, H. A.* Amst. Ak. Vs. M. 17 (1882) 179-; Arch. Néerl. 17 (1882) 193-.
- scope and calorimeter. *Bennett, A. R.* Manch. Lt. Ph. S. Mm. & P. 41 (1897) xxvii-.
- thermoscope. *Cooley, Le R. C.* Franklin I. J. 66 (1873) 343-; 67 (1874) 408-; 70 (1875) 134-; 74 (1877) 326-.
- Draught controller. *Gauthier, G. A.* Mines 11 (1847) 117-.

DUST FIGURES.

- Dust photographs. *Thiselton-Dyer, W. T.* Nt. 47 (1892-93) 341-.
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- Lesé, R. A. Agn. 16 (1890) 30-.
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- Baumgartner, A. von. Wien SB. 38 (1859) 379-.
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- Brettes, M. de. [Martin de Brettes, —.] Les Mondes 3 (1863) 717-.
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- Dahländer, G. R. [1864] Stockh. Öfv. 21 (1865) 169-; A. C. 4 (1865) 474-.
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- Serrano y Fatigati, H. Arch. Sc. Ps. Nt. 48 (1873) 252-.
- Puluj, J. [1875] Wien Ak. Sb. 71 (1875) (Ab. 2) 677-; 72 (1876) (Ab. 2) 53-.
- (First report.) Brit. Ass. Comm. B. A. Rp. (1876) 275.
- Joule, J. P. [1878] Phil. Trans. 169 (1879) 365-.
- Waltenhofen, A. von. [1879] Wien Ak. Sb. 80 (1880) (Ab. 2) 137-.
- Bartoli, A. Rm. R. Ac. Linc. Mm. 8 (1880) 67-.
- Fletcher, L. B. [1881] (xii) J. H. Un. Cir. [1] (1882) 128.
- Dieterici, C. D. Nf. Tbl. (1887) 236-; A. Ps. C. 33 (1888) 417-.
- Perot, A. A. C. 13 (1888) 145-.
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- Deprez, M. C. R. 112 (1891) 1403-.
- Slotte, K. F. Helsingf. Öfv. 33 (1891) 162-.
- Christiansen, C. A. Ps. C. 48 (1893) 374-.
- Griffiths, E. H. Nt. 47 (1892-93) 537; Phil. Trans. (A) 184 (1894) 361-; R. S. P. 55 (1894) 23-.
- Ayrton, W. E., & Haycraft, H. C. [1894] L. Ps. S. P. 13 (1895) 295-; Ph. Mg. 39 (1895) 160-.
- Weber, L. D. Nf. Vh. (1895) (Th. 2, Hälfte 1) 38-.
- Pernet, J. Zür. Vjschr. 41 (1896) (Festschr., Th. 2) 121-.
- Perot, A. A. C. 7 (1896) 574.
- Baille, J. B., & Féry, C. C. R. 126 (1898) 1494-.
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- —. Joule, J. P. B. A. Rp. 37 (1867) 512-.
- —. Webster, A. G. Am. Ac. P. 20 (1885) 490-.

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- Laws of distribution of energy and their limitations. *Bryan, G. H. B.* *A. Rp.* (1894) 64-.
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- Maxwell's demons. *Whiting, H.* *Science* 6 (1885) 83.
- law, extension proposed by Vyšnegradskij. *Sokolov, A. P.* *Mosc. S. Nt. Bll.* 60 (1884) 245-.
- Motivity, thermodynamic. *Thomson, (Sir) W.* [1876] *Edinb. R. S. T.* 28 (1879) 741-.
- Reversible processes and equilibrium of applied forces. *Schiller, N. N.* *Rs. Ps.-C. S. J.* 27 (*Ps.*) (1895) 197-; *Fachr. Mth.* (1895) 1039-.
- transformations. *Gouy, —.* *C. R.* 108 (1889) 341-.

THE SECOND LAW.

- Clausius, R.* *Pogg. A.* 93 (1854) 481-.
- Achard, A.* *Arch. Sc. Ps. Nt.* 22 (1865) 214-.
- Clausius, R.* *C. R.* 60 (1865) 1025-.
- Rankine, W. J. M.* *Ph. Mg.* 30 (1865) 241-; *A. C.* 12 (1867) 258-.
- Clausius, R.* *Ph. Mg.* 35 (1868) 405-.
- Loschmidt, J.* *Wien Sb.* 59 (1869) (*Ab. 2*) 395-.
- Most, R.* *A. Ps. C.* 136 (1869) 140-.
- (*Most.*) *Boltzmann, L.* *A. Ps. C.* 137 (1869) 495-.
- (*Boltzmann.*) *Most, R.* *A. Ps. C.* 138 (1869) 566-.
- (*Most.*) *Boltzmann, L.* *A. Ps. C.* 140 (1870) 635-.
- Mach, E.* (*xii*) *Lotos* 21 (1871) 17-.
- Belpaire, T.* *Brux. Ac. Bll.* 34 (1872) 509-.
- Kurz, A.* *Carl Rpm.* 8 (1872) 161-.
- Nichols, R. C.* *Ph. Mg.* 1 (1876) 369-.
- Wood, De V.* *Franklin I. J.* 85 (1883) 347-.
- Eddy, H. T.* *Franklin I. J.* 85 (1883) 440-.
- Webb, J. B.* *Am. As. P.* (1885) 143-.
- Boltzmann, L.* *Wien Alm.* 36 (1886) 225-.
- Pirogov, N. N.* *Rs. Ps.-C. S. J.* 18 (*Ps.*) (1886) 307-; *Fachr. Ps.* (1886) (*Ab. 2*) 238-.
- Pictet, R.* *D. Nf. Tbl.* (1887) 231-.
- Wald, F.* *Z. Ps. C.* 1 (1887) 408-; 2 (1888) 523-.
- Wood, De V.* *Franklin I. J.* 123 (1887) 128-, 196-, 298-.
- Farkas, G.* *Orv.-Termt. Éts. (Termt. Szak)* (1888) 241-, 279-.
- Natanson, W.* *Kosmos (Lw.)* 13 (1888) 256-.
- Wiedemann, E.* *A. Ps. C.* 38 (1889) 485-.
- Brit. Ass. Comm. (Bryan, G. H.)* *B. A. Rp.* (1891) 85-.
- Burbury, S. H.* [1893] *Nt.* 49 (1893-94) 150-.
- Bryan, G. H.* [1893] *Nt.* 49 (1893-94) 197-.
- Tiurin, V. A.* *Rs. Ps.-C. S. J.* 25 (*Ps.*) (1893) 112-.
- Burbury, S. H.* *Nt.* 49 (1893-94) 246-; *Ph. Mg.* 37 (1894) 574-.

- Casalunga, D. A.* As. Fr. C. R. (1894) (Pt. 1) 120-.
- Pünning, —.* [1894] Westf. Vr. Jbr. (1894-95) 237-.
- Vliet, P. P. van der.* Rs. Ps.-C. S. J. 26 (Ps.) (1894) 78-.
- Lodge, O. J.* Elect. 35 (1895) 80-.
- Casalunga, D. A.* As. Fr. C. R. (1898) (Pt. 1) 114.
- Schiller, N.* Rs. Ps.-C. S. J. 30 (Ps.) (1898) 31-; J. de Ps. 7 (1898) 674.
- alleged exception. *Gibbs, J. W.* Science 1 (*1883) 160.
- confirmation. *Hirn, G. A.* Moigno Cosmos 22 (1863) 413-.
- critical exposition. *Wand, T.* Carl Rpm. 4 (1868) 281-, 369-.
- deduced from equilibrium of *vis viva*. *Boltzmann, L.* Wien Sb. 63 (1871) (Ab. 2) 712-.
- first. *Szilý, K.* [1875] A. Ps. C. (Ergänz.) 7 (1876) 154-.
- demonstration from mechanical principles. *Michelson, V. A.* Rec. Mth. (Moseou) 13 (1886) 229-.
- deviation from first law. *Eddy, —.* D. Nf. Tbl. (*1879) 175-.
- and diffusion. *Boltzmann, L.* [1878] Wien Ak. Sb. 78 (1879) (Ab. 2) 733-.
- *Clausius, R.* A. Ps. C. 4 (1878) 341-.
- of matter. *Preston, S. T.* [1877] Nt. 17 (1878) 31-.
- extension. *Achard, G.* Arch. Sc. Ps. Nt. 32 (1868) 89-.
- foundation. *Schiller, N. N.* Rs. Ps.-C. S. J. 32 (Ps.) (1900) 37-; Fsch. Ps. (1900) (Ab. 2) 181.
- and Hamilton's principle. *Szilý, C. A.* Ps. C. 145 (1872) 295-.
- *Clausius, R.* A. Ps. C. 146 (1872) 585-.
- *Müller, J. J.* A. Ps. C. 152 (1874) 105-.
- interpretation, and definition of temperature. *Mallard, E.* C. R. 75 (1872) 1479-.
- and kinetic theory of gases. *Burbury, S. H.* Ph. Mg. 1 (1876) 61-.
- — — (Maxwell's demons). [1900] *Lippmann, G.* Sc. Abs. 4 (1901) 381.
- mechanical analogies. *Boltzmann, L.* Crelle J. Mth. 100 (1887) 201-.
- demonstration. *Crotti, F.* Mil. I. Lomb. Rd. 12 (1879) 333-.
- formulæ. *Clausius, R.* Berl. Ak. Sb. (1884) 663-.
- interpretation. *Boltzmann, L.* Wien Sb. 53 (1866) (Ab. 2) 195-.
- and motor without fuel. *Mehner, H.* Franklin I. J. 134 (1892) 89-.
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- and principle of least action, priority claim. *Boltzmann, L.* A. Ps. C. 143 (1871) 211-.
- — — — (Boltzmann). *Clausius, R.* A. Ps. C. 144 (1872) 265-.
- probability (thermal equilibrium). *Boltzmann, L.* [1877] Wien Ak. Sb. 76 (Ab. 2) (1878) 373-.
- and radiant heat. *Eddy, H. T.* [1882-84] Am. Ph. S. P. 20 (1883) 334-; Science 1 (*1883) 248; 2 (*1883) 793-; 3 (1884) 88, 171-; 4 (1884) 3-.
- *Bartoli, A.* N. Cim. 15 (1884) 193-; Rv. Sc.-Ind. 16 (1884) 224-.
- *Wood, De V.* Science 3 (1884) 32.
- *FitzGerald, G. F.* Science 3 (1884) 88, 586; Duhl. S. Sc. P. 4 (1885) 57-.
- radiation, relations. *Boltzmann, L.* A. Ps. C. 22 (1884) 31-, 616.
- *Wien, W.* Berl. Ak. Sb. (1893) 55-.
- referred to general mechanical principles. *Clausius, R.* Bonn SB. Niedr. Gs. (1870) 167-.
- and Tesla's experiments. *Hutin, M., & Leblanc, M.* Lum. Élect. 43 (1892) 451-.
- theory of radiation. *Lorentz, H. A.* [1900] Amst. Ak. Vs. 9 (1901) 418-; Amst. Ak. P. 3 (1901) 436-.
- Stationary motion, theory. *Oppenheim, S.* A. Ps. C. 15 (1882) 495-.
- Temperature entropy diagrams. *Burstall, H. F. W.* B. A. Rp. (1894) 758.
- equilibrium, and continuance of life. *Preston, S. T.* Nt. 19 (1879) 460-, 555; 20 (1879) 28.
- — recurring changes in the universe. *Preston, S. T.* Ph. Mg. 8 (1879) 152-; Wien Ak. Sb. 87 (1883) (Ab. 2) 806-.
- , relation of intrinsic energy and state of aggregation to. *Grassi, G.* Mil. I. Lomb. Rd. 10 (1877) 811-.
- Theorem of Clausius. *Buckingham, E.* Ps. Rv. 4 (1897) 39-.
- Thermal equilibrium, laws. *Boltzmann, L.* [1881] Wien Ak. Sb. 84 (1882) (Ab. 2) 136-.
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- potential. *Schiller, N.* Mosc. S. Sc. Bll. 91 (No. 1) (1894) 22-; Fsch. Ps. (1894) (Ab. 2) 199-.
- , analogue. *Clausius, R.* C. R. 70 (1870) 1314-.
- , applications. *Voigt, W.* Gött. Nr. (1895) 134-.
- , derivatives with regard to *T* and *p* for composite components. *Laar, J. J. van.* Arch. Néerl. 5 (1900) 484-.
- , general expression. *Oumoff, N.* Mosc. S. Nt. Bll. 8 (1895) 138-.
- and hydrostatic pressure. *Duhem, P.* Par. Éc. Norm. A. 10 (1893) 183-.
- , kinetic interpretation. *Waals, J. D. van der.* Amst. Ak. Vs. 3 (1895) 205-; Arch. Néerl. 30 (1897) 137-.
- and primary cells. *Duhem, P.* C. R. 99 (1884) 1113-.
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- Thermodynamic potentials. *Beltrami, E.* Rm. R. Ac. Linc. Rd. 4 (1895) (*Sem.* 1) 473-.
- , thermokinetic properties. *Natanson, W.* [1897] *Krk. Ak. (Mt.-Prz.) Rz.* 14 (1899) 67-; *Z. Ps. C.* 24 (1897) 302-.
- Thermodynamics and permanent deformations. *Brillouin, M.* *C. R.* 106 (1888) 416-, 482-, 537-, 589-; *J. de Ps. 7* (1889) 327-; 8 (1889) 169-.
- , recent progress. *Kowalski, J.* *Prace Mt.-Fiz.* 3 (1892) 143-.
- Transformation of energy, general law. *Rankine, W. J. M.* *Ph. Mg.* 5 (1853) 106-.
- forces. *Büchner, —.* [1892] [*Pollich.* (47-53) (1888-95)] 104-.
- “Unique case,” principle of. *Ostwald, W.* *Leip. Mth. Ps. B.* 45 (1893) 599-; 46 (1894) 276-; 47 (1895) 37-.
- , — — (Ostwald) *Lie, S.* *Leip. Mth. Ps. B.* 46 (1894) 135-.
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- Vortex-theory in thermodynamics. *Jougnat, —.* *C. R.* 131 (1900) 1190-.
- Weyher's phenomena, theory. *Gosiewski, W.* *Krk. Ak. (Mt.-Prz.) Rz.* 19 (1889) 193-; *Cre. Ac. Sc. Bil.* (1889) (*No.* 5) xxix-.
- Work, quantity attainable by the reversible cycle of permanent gases. *Oettingen, A. J. von.* *A. Ps. C. (Ergänz.)* 5 (1871) 540-.

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- Auerbach, F.* *A. Ps. C.* 64 (1898) 754-.
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- Wiedeburg, O.* *A. Ps. C.* 65 (1898) 921-.
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- Absolute method of graduating a thermometer, Kelvin's. *Rose-Innes, J. L.* *Ps. S. P.* 16 (1899) 26-; *Ph. Mg.* 45 (1898) 227-.
- scale of temperature, numerical evaluation. *Lehfeldt, R. A.* *Ph. Mg.* 45 (1898) 363-.
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- Analytical expression. *Lippmann, G. J. de* *Ps.* 3 (1884) 277-.
- Determination. *Lorenz, L.* *Kjöb. Ov.* (1872) 1-; *A. Ps. C.* 147 (1872) 429-.
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- fluids in motion. *Joule, J. P., & Thomson, W.* *Phil. Trans.* (1853) 357-; (1854) 321-; *R. S. P.* 10 (1859-60) 502; *Phil. Trans.* (1862) 579-.
- — — — —; temperature effects on solids exposed. *Joule, J. P., & Thomson, W. R.* *S. P.* 8 (1856-57) 41-, 178-, 556-; *Phil. Trans.* (1860) 325-.

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- Ramsay, W., & Young, S. L.* *Ps. S. P.* 8 (1887) 56-; *Ph. Mg.* 22 (1886) 32-.
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- and isothermals, relation of specific heat in. *Dahlander*, G. R. Stockh. Öfv. 31 (1874) No. 7, 3-.
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- Characteristic equation and energy equation. *Wiedeburg*, O. A. Ps. C. 69 (1899) 66-.
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- —, mixture, specific heat at constant volume. *Olearski, K.* [1892] Krk. Ak. (Mt.-Prz.) Rz. 6 (1893) 112-; Crc. Ac. Sc. Bil. (1892) 297-.
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- —, direct measurement. *Blondel, A.* C. R. 120 (1895) 550-; Éclair. Elect. 2 (1895) 385-; 3 (1895) 57-, 406-, 538-, 583-; 8 (1896) 49-.
- , —, Talbot's law, proof. *Brodhun, E., & Lummer, O.* Berl. Ps. Gs. Vh. (1890) 92-.
- , —, transformation of variations. *Dussaud, —.* C. R. 127 (1898) 417-.
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- *Rood*, O. N. [1877] Am. J. Sc. 15 (1878) 81-.
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- (reflected). *Abney*, (Capt.) W. de W., & *Festing*, (Maj.-Gen.) E. R. [1888] Phil. Trans. (A) 179 (1889) 547-.
- *Abney*, (Capt.) W. de W. C. S. P. 7 (1891) 150-.

- of colours. *Abney, (Capt.) W. de W., & Festing, (Maj.-Gen.) E. R.* Phil. Trans. (A) 183 (1893) 531-.
- — — *Lovibond, J. W.* Mer. S. J. (1893) 275-.
- — — *Mayer, A. M.* Am. J. Sc. 46 (1893) 1-.
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- — — *Seeliger, H.* [1888] Münch. Ak. Sb. 18 (1889) 201-.
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- Fizeau, H. L., & Foucault, L.* C. R. 18 (1844) 746-.
- Géraldy, F.* Lum. Élect. 1 (*1879) 64-.
- Sabine, R. B. A. Rp.* (1882) 667-.
- Genung, N. H.* Elect. Rv. 31 (1892) 722-.
- arc, continuous current, as standard light. *Blondel, A.* [1893] Elect. 32 (1894) 117-145-, 169-.
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- — — *Krüss, H.* Elekttech. Z. 8 (1887) 356-.
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- , secondary standard. *Guilbert, F.* Lum. Élect. 47 (1893) 573-.
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- — — *Crova, A.* As. Fr. C. R. (1889) (Pt. 2) 336-.
- — — *Liebethal, E.* Z. Instk. 19 (1899) 193-, 225-.
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- incandescent lamps and Auer's gas lamps. *Abt, A. Orv.-Termt. Éts. (Termt. Szak)* (1894) 294-, 347-.
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- — — electrical measurements. *Preece, W. H. B. A. Rp.* (1884) 654-.
- — — — — *Strecker, —.* Elekttech. Z. 8 (1887) 76-.
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- *Charpentier*, A. (ix) Nancy S. Sc. Bll. 6 (16^e Ann. 1883) (1884) xxvi-.
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- Nicod-Delom*, J. S. Bb. Un. 55 (1834) 55-.
- Osann*, G. *Pogg.* A. 33 (1834) 405-.
- Babinet*, J. B. A. Rp. (1854) (pt. 2) 2.
- Bernard*, F. B. A. Rp. (1854) (pt. 2) 4-.
- Frisiani*, P. *Mil. Mm. I. Lomb.* 7 (1859) 389-.
- Dove*, H. W. *Berl. Mb.* (1861) 483-.
- Hirsch*, A. [1862] *Neuch. Bll.* 6 (1861-63) 94-.
- Rood*, O. N. (viii) *Am. J. Sc.* 36 (1863) 60-.
- Stevenson*, T. *Edinb. N. Ph. J.* 17 (1863) 208-.
- Bennington*, C. H. *Ph. Mg.* 34 (1867) 475-; 35 (1868) 78.
- Hagenbach*, E. *Sch. Gs. Vh.* 51 (1867) 66.
- Wesely*, J. *Z. Mth. Ps.* 16 (1871) 324-.
- Bruhns*, C. C. *Leip. As. Gs. Vjschr.* 10 (1875) 235-.
- Glan*, P. A. Ps. C. 1 (1877) 351-.
- Reynolds*, O. *Phil. Trans.* 166 (1877) 725-.
- Napoli*, D. *Par. S. Ps. Sé.* (1880) 53-.
- Conroy*, (Sir) J. *Ph. Mg.* 15 (1883) 423-; L. Ps. S. P. 5 (1884) 253-.

- Simonov*, L. N. C. R. 97 (1883) 1055-.
- König*, A. *Berl. Ps. Gs. Vh.* (1886) 9-.
- Grosse*, W. *Z. Instk.* 7 (1887) 129-; 8 (1888) 95-; 129-.
- Grashof*, —. [1889] *Karlsruhe Nt. Vr. Vh.* 11 (1896) (Sb.) 44-.
- Palaz*, A. *Lum. Élect.* 31 (1889) 220-; 35 (1890) 520-, 574-, 611-.
- Lehmann*, E. W. A. Ps. C. 49 (1893) 672-.
- Mesnard*, E. *Par. S. Ps. Sé.* (1893) 172-.
- Trotter*, A. P. L. Ps. S. P. 12 (1894) 354-; *Ph. Mg.* 36 (1893) 82-.
- Murani*, O. *Mil. I. Lomb. Rd.* 27 (1894) 316-.
- Spurge*, J. B. L. Ps. S. P. 12 (1894) 522.
- Onimus*, —. C. R. 127 (1898) 663-.
- Martens*, F. F. D. Ps. Gs. Vh. (1899) 278-.
- accurate and universally applicable, requisites for. *Krecker*, F. W. C. *Rot. N. Vh.* 12 (1^{ste} *Stuk*) (1851) 5-.
- analysing. *Govi*, G. C. R. 50 (1860) 156-; *N. Cim.* 11 (1860) 38-.
- in astronomy. *Sachsen-Altenburg*, (Prinz) *Ernst* von. [1894] *Mt. Ostld.* 8 (1898) 15-.
- audible. *Giltay*, J. W. [1881] *Nt. 25* (1882) 125.
- automatic, by revolutions of radiometer. *Olivier*, L. C. R. 106 (1898) 840-.
- bi-refracting prism. *Abria*, —. *Bordeaux Act.* (1843) 353-.
- on Bouguer's principles. *Ritchie*, W. *Edinb. R. S. T.* 10 (1826) 443-.

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- Langberg*, C. N. *Mg. Ntvd.* 9 (1857) 97-.
- Bohn*, C. *Lieb. A.* 111 (1859) 335-.
- Hajech*, C. *Mil. I. Lomb. Rd.* 4 (1867) 77-.
- Rüdorf*, F. A. Ps. C. *Jubelbd.* (1874) 234-.
- Kriess*, A. H. *Hamb. Nt. Vr. Vh.* 5 (1881) 71-; *Hamb. Nt. Vr. Ab.* 8 (1884) No. 4, 8 pp.
- Palaz*, A. *Lum. Élect.* 31 (1889) 267-.
- Boulouch*, R. C. R. 111 (1890) 642-.
- accuracy for measurements of photographic density, and sector photometer. *Abney*, (Capt.) W. de W. S. C. In. J. 9 (1890) 722-.
- — — — — (Abney). *Hurter*, F., & *Driffield*, V. C. S. C. In. J. 9 (1890) 725.
- — — — — (Hurter & Driffield). *Abney*, (Capt.) W. de W. S. C. In. J. 10 (1891) 18-.
- — — — — (Abney). *Hurter*, F., & *Driffield*, V. C. S. C. In. J. 10 (1891) 20-, 98-.
- improvements. *Gezechus* [*Heschus*], N. A. Rs. Ps.-C. S. J. 20 (Ps.) (1888) 107-; J. de Ps. 8 (1889) 539.
- *Nebel*, B. *Exner Rpm.* 24 (1888) 724-.
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- with 3 spots and inclined or rotating screen. *Gezechus* [*Heschus*], N. A. Rs. Ps.-C. S. J. 24 (Ps.) (1892) 165-; J. de Ps. 2 (1893) 504-.

- theory. *Weber, L.* Bresl. Schl. Gs. Jbr. (1887) 108-.
- *Lewis, D. M.* Nt. 40 (1889) 174.
- and colorimeter. *Grosse, W.* D. Nf. Tbl. (1888) 6-.
- compensation-. *Krüss, H.* Cztg. Opt. 6 (1885) 219-.
- (*Krüss*). *Strecker, K.* Cztg. Opt. 8 (1887) 222-.
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- (*Krüss*), improved. *Lačínov, D.* Rs. Ps.-C. S. J. 20 (Ps.) (1888) 247-; J. de Ps. 8 (1889) 543-.
- complementary. *Brücke, E.* Z. Instk. 10 (1890) 11-.
- for control of gas-lighting. *Poppe, A.* (vi *Adds.*) Frkf. Jbr. Ps. Vr. (1857-58) 74-.
- cosine-. *Arnoux, Dieudonné, E.* Lum. Élect. 23 (1887) 555-.
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- depending on phosphorescence of zinc sulphide. *Henry, C.* C. R. 128 (1899) 941-.
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- for diffused light. *Weber, L.* Bresl. Schl. Gs. Jbr. (1884) 241-.
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- , simplified. *Perry, J., & Ayrton, W. E.* L. Ps. S. P. 5 (1884) 109-; Ph. Mg. 14 (1882) 45-.
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- "flicker." *Rood, O. N.* Am. J. Sc. 46 (1893) 173-.
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- — — *Cogliervina, D.* Cztg. Opt. 8 (1887) 97-.
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- iodide of nitrogen. *Lion, —.* Nt. 42 (1890) 511.
- Leslie's. *Ritchie, W.* Edinb. J. Sc. 2 (1825) 321-; 3 (1825) 104-.
- for light reflected by metallic surfaces. *Rood, O. N.* Am. J. Sc. 49 (1870) 145-.
- Lummer and Brodhun's (replacement of grease spot). *Lummer, O., & Brodhun, E.* Z. Instk. 9 (1889) 23-.
- — — (Swan's). *Knott, C. G.* [1899] Edinb. R. S. P. 23 (1902) 12-.
- — — (Knott). *Lummer, O., & Brodhun, E.* Ph. Mg. 49 (1900) 541-.
- magnetic. *Coulon, R.* Lum. Élect. 5 (*1881) 66-, 234-, 297-.
- Mascart's. *Dieudonné, E.* Lum. Élect. 28 (1888) 114-.
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- and optical chamber for demonstration. *Kolbe, B.* Z. Instk. 7 (1887) 77-.
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- and photometry. *Palaz, A.* Lum. Élect. 35 (1890) 416-.
- polarimeter. *Wild, H.* Pogg. A. 99 (1856) 235-; Bern Mt. (1859) 24-; Sch. Gs. Vh. 46 (1862) 107-.
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- , for measuring contrast-intensity of Röntgen rays. *Boas, H.* D. Ps. Gs. Vh. (1899) 242-.
- , — technical purposes, examination of Wenham gas lamps. *Wild, H.* [1887] St. Pét. Ac. Sc. Mm. (Rs.) 63 (1890) (*App. No.* 1) 31 pp.; St. Pét. Ac. Sc. Bll. 32 (1888) 193-.
- — —, simplification. *Wild, H.* [1888] St. Pét. Ac. Sc. Bll. 33 (1890) 5-.
- , — white light. *Martens, F. F.* D. Ps. Gs. Vh. (1899) 204-; Ps. Z. 1 (1900) 299-.
- portable. *Salomons, (Sir) D.* [1893] I. Elect. E. J. 22 (1894) 197-.
- , improved. *Preece, W. H., & Trotter, A. P.* Elect. 35 (1895) 671-.
- Potter's. *Poggendorff, J. C.* Pogg. A. 29 (1833) 484-.
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- for purposes of school hygiene. *Petrushevskij, T.* Rs. Ps.-C. S. J. 16 (Ps.) (1884) 295-, 565-; Fsch. Ps. (1884) (*Ab.* 2) 120-.
- radial, and the proposed standards of light. *Dibdin, W. J.* S. C. In. J. 3 (1884) 277-; 4 (1885) 250-.
- reflecting. *Kurz, A.* Sch. Pol. Z. 6 (1861) 66-.

- registering, for measuring light in lake and ocean depths. *Regnard*, —. Par. S. Bl. Mm. 40 (1888) (C. R.) 626-.
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- tangent-. *Bothe*, F. A. Ps. C. 128 (1866) 628-.
- universal. *Schafhäütl*, C. E. CE. I. P. 1 (1841) 101-; Münch. Ab. 7 (1855) 465-.
- Weber's. *Redwood*, B. S. C. In. J. 4 (1885) 446-.
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- and diaphragm-. *Sabine*, R. Ph. Mg. 15 (1883) 22-.
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- , by papers sensitive to light. *Crzellitzer*, A. Arch. Hyg. 38 (1900) 317-.
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- , magnetic and photometric. *Hanappe, S.* Rv. Un. Mines 36 (1896) 245-.
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- , platinum unit of the Phys.-Techn. Reichsanstalt. *Kurlbaum, F., & Lummer, O.* Berl. Ps. Gs. Vh. (1895) 56-.
- , Siemens's platinum normal lamp, experiments. *Liebenthal, E.* *Elekttech. Z.* 9 (1888) 445-.
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- , theorem. *Dieu, T.* N. A. Mth. 9 (1850) 409-.
- , true. *Werneburg, J. F. C.* Ac. Cæs. Leop. N. Acta 14 (1828) 573-.
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- and minimum deviation. *Ferrini, R. E. D. T.* (xii) *Rv. Sc.-Ind.* 11 (1879) 493-.
- — —. *Grimaldi, G.* (xii) *Rv. Sc.-Ind.* 12 (1880) 224-.
- — —. *Buzzolini, G.* (xii) *Rv. Sc.-Ind.* 15 (1883) 302-.
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- —. *Bauer, K. L.* *A. Ps. C.* 132 (1867) 658-; *Carl Rpm.* 3 (1867) 28-, 377-.
- —. *Clark, P. M.* *Mess. Mth.* 4 (1868) 167-.
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- —. *Airy, O.* [1869] *Mess. Mth.* 5 (1871) 88-.
- —. *Most, R.* *A. Ps. C.* 139 (1870) 505-; 141 (1870) 601-.
- —. *Kurz, A.* *A. Ps. C.* 140 (1870) 658-.
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- —. *Lommel, E. C. J.* *A. Ps. C.* 156 (1875) 578-.
- —. *Berg, F. W.* *A. Ps. C.* 158 (1876) 651-.
- —. *Lommel, E. C. J.* [1876] *Erlang. Ps. Md. S. Sb.* 9 (1877) 14-.
- —. *Gezekhus [Heschus], N. A.* (xii) *Rs. Ps.-C. S. J.* 12 (*Ps.*) (1880) [*Pt.* 1] 226-; (x) *A. Ps. C.* 6 (1882) 227-.
- —. *Scheibach, C. H.* *A. Ps. C.* 14 (1881) 367-.
- —. *Kessler, F.* *A. Ps. C.* 15 (1882) 333-.
- —. *Kraevich, K. D.* [1883] (xii) *Rs. Ps.-C. S. J.* 16 (*Ps.*) (1884) 8-; *Fschr. Ps.* (*1884) (*Ab.* 2) 43-.
- —. *Zilov, P.* *Rs. Ps.-C. S. J.* 16 (*Ps.*) (1884) 168-; *Fschr. Ps.* (1884) (*Ab.* 2) 43-.
- —. (Kraevich). *Volkov, M.* *Rs. Ps.-C. S. J.* 16 (*Ps.*) (1884) 174-.
- —. *Rosenberg, V.* *Rs. Ps.-C. S. J.* 16 (*Ps.*) (1884) 267-; *Fschr. Ps.* (1884) (*Ab.* 2) 42-.
- —. (Volkov). *Kraevich, K.* *Rs. Ps.-C. S. J.* 16 (*Ps.*) (1884) 269-.
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- —. *Vliet, P. P. van der.* *Rs. Ps.-C. S. J.* 17 (*Ps.*) (1885) 399-.
- —. *Lermantov, V. V.* *Rs. Ps.-C. S. J.* 18 (*Ps.*) (1886) 12-; *J. de Ps.* 4 (1885) 589-.
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- of monochromatic light. *Almeida, C. A. M. de.* Lisb. J. Sc. Mth. 8 (1881) 80-.
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- — —, wave influence. *Soret, C.* Arch. Sc. Ps. Nt. 4 (1897) 530-; Sch. Nf. Gs. Vh. (1897) 58.
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- theory. *Pinto, L.* Nap. Ac. Pont. At. 28 (1898) No. 11, 24 pp.
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- Jamin*, J. C. R. 45 (1857) 892-.
- Zenger*, C. W. Brux. Ac. Bll. 8 (1859) 191.
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- Pichot*, J. C. R. 48 (1859) 120-.
- Zinken* genannt *Sommer*, H. Pogg. A. 107 (1859) 47-.
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- Gibbs*, O. W. Am. Ac. P. 10 (1875) 401-.
- Waha*, M. de. Lux. I. Pb. 16 (1877) 143-.
- Wagner*, A. (xii) Kolozsvár Orv.-Term. Társ. Éts. [3] (1879) (Term. Szak) 37-.
- Lommel*, E. Z. Instk. 5 (1885) 124-, 200.
- Forst*, E. Rs. Ps.-C. S. J. 20 (Ps.) (1888) 230-; Ftschr. Ps. (1888) (Ab. 2) 47.
- Walter*, B. Hamb. Ws. Anst. Jb. 9 (Pt. 1) (1891) 255-.
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- Ravilins*, B. L. Am. Mer. J. 18 (1897) 155-.
- Tolomei*, G. Rv. Sc. Ind. 29 (1897) 279-.
- Weiss*, G. J. de Ps. 6 (1897) 688-.
- of absorbing media. *Voigt*, W. Gött. Nr. (1884) 283-.
- ammonium sulphate. *Erofejeff*, M. Wien Sb. 55 (1867) (Ab. 2) 543-.
- by angle of polarisation. *Pfaff*, (Dr.) F. A. Ps. C. 127 (1866) 150-.
- — — (Pfaff). *Des Cloizeaux*, A. A. Ps. C. 129 (1866) 479-.
- of anisotropic microscopic objects. *Ambrohn*, H. Leip. Mth. Ps. B. 45 (1893) 316-.
- by auto-collimation. *Féry*, C. C. R. 119 (1894) 402-; As. Fr. C. R. (1895) (Pt. 2) 437-.
- of crystals, by prism. *Viola*, C. Z. Instk. 19 (1899) 276-.
- fluids. Brewster's method. *Zehender*, W. Arch. f. Oph. 3 (1857) (Ab. 1) 99-.
- gases. *Biot*, J. B., & *Arago*, —. Par. Mm. de l'I. 7 (1806) 301-.
- (Biot and Arago). *Gilbert*, L. W. Gilbert A. 26 (1807) 36-.
- — — *Jamin*, J. A. C. 49 (1857) 280-.
- (liquefied). *Zahn*, W. von. Leip. Nf. Gs. Sb. 5 (1878) 34-.
- — — (*Dechant*, J. Wien Ak. Sb. 90 (1885) (Ab. 2) 539-; Mh. C. (1884) 615-.
- — — influence of temperature and pressure. *Mascart*, E. E. N. C. R. 78 (1874) 617-; Par. Éc. Norm. A. 6 (1877) 9-.

- of glass, etc. *Krusper*, S. von. Ung. NW. Vr. Jb. (1858) 106-.
- — plates. *Wiedemann*, E. E. G. Arch. Sc. Ps. Nt. 51 (1874) 340-.
- glowing platinum. *Zeeman*, P. Amst. Ak. Vs. 4 (1896) 116-.
- at high temperatures, by total reflectometer. *Brühl*, J. W. Berl. B. 24 (1891) 286-.
- of immersion fluids. *Smith*, H. L. Am. S. Mer. P. (1885) 83-.
- liquids. *Forthomme*, C. A. C. 60 (1860) 307-.
- — — *Montigny*, C. Brux. Ac. Bll. 18 (1864) 10-.
- — — *Croullebois*, M. A. C. 22 (1871) 139-.
- — — *Terquem*, A., & *Trannin*, H. C. R. 78 (1874) 1843-; J. de Ps. 4 (1875) 232-.
- — — *Waha*, M. de. J. de Ps. 6 (1877) 186-.
- — — *Macé de Lépinay*, J. J. de Ps. 9 (1880) 200-.
- — — (coloured). *Christiansen*, C. Kjöb. Ov. (1882) 217-; A. Ps. C. 19 (1883) 257-.
- — (heterogeneous). *Littlewood*, T. H. L. Ps. S. P. 13 (1895) 74-; Ph. Mg. 37 (1894) 467-.
- — — by Billet's liquid compensator. *Croullebois*, M. A. C. 22 (1871) 509-.
- — — fluid lenses. *Pil'chikov*, N. D. (xii) Rs. Ps.-C. S. J. 13 (Ps.) (1881) [(Pt. 1)] 393-.
- — — and glass plates. *Wiedemann*, E. E. G. A. Ps. C. 158 (1876) 375-.
- — — simple method. *Bodyński*, J. Carl Rpm. 18 (1882) 502-.
- — — by telescope and scale method. *Ruoss*, H. A. Ps. C. 48 (1893) 531-.
- — — use of hollow prisms. *Pařízek*, A. P., & *Šulc*, O. Prag České Ak. Fr. Jos. Rz. (Třída 2) 3 (1894) Art. 1, 30 pp.
- without measurement of angles. *Zenger*, C. V. C. R. 99 (1884) 377-.
- and measurement of curvature. *Boys*, C. V. Ph. Mg. 14 (1882) 30-.
- by microscope. *Kayser*, E. [1888] Danzig Schr. 7 (1888-91) (Heft 2) xi-.
- — — of glass. *Royston-Pigott*, G. W. QJ. Mer. Sc. 12 (1872) 273-.
- — — liquids. *Harting*, P. J. Mer. Sc. 6 (1858) 107-.
- — — — — *Sorby*, H. C. C. S. J. 33 (1878) 487-.
- — — — — *Thompson*, G. Nt. 34 (1886) 157.
- — — — — and transparent plates. *Bertin*, A. A. C. 26 (1849) 288-; C. R. 23 (1849) 447-.
- of microscopic objects. *Israel*, O. Z. Ws. Mkr. 16 (1899) 349-.
- minerals, by total reflection. *Thoulet*, M. J. O. (xii) Fr. S. Mn. Bll. 6 (1883) 184-.
- mixed alcohols. *Blaserna*, P. Gz. C. It. 2 (1872) 69-.
- mounting media, method. *Nelson*, E. M. Mer. S. J. (1892) 141-; (1894) 655-.
- opaque bodies. *Malus*, É. L. [1807] Par. Mm. Sav. Étr. 2 (1811) 509-.
- parallel faced bodies. *Croullebois*, M. C. R. 68 (1869) 1209-.

by photography. *Lumière, A., & Lumière, L.* C. R. 124 (1897) 1438-.

— Poggendorff's method. *Bierliet, — van.* Brux. S. Sc. A. 12 (1888) (Pt. 1) 74-.

of prism. *Geronzi, B. T.* Rv. Sc.-Ind. 23 (1891) 221-.

by prism and by total reflection. *Dufet, H.* Par. S. Ps. Sé. (1891) 212-.

of quartz. *Esselbach, E.* Pogg. A. 98 (1856) 541-.

rapid. *Cominotto, E.* Rv. Sc.-Ind. 32 (1900) 49-.

by sextant. *Swan, W.* [1843] Edinb. N. Ph. J. 36 (1844) 102-.

of small crystals. *Sorby, H. C.* Mn. Mg. 1 (1877) 97-.

— solids. *Feussner, K. N.* Jb. Mn. (1883) (Bd. 2) 89-.

— strong solution of cyanin. *Lang, V. von.* [1881] Wien Ak. Sb. 84 (1882) (Ab. 2) 361-.

— — — — (Lang). *Pulfrich, C. A.* Ps. C. 16 (1882) 335-.

— sugar solutions. *Obermayer, A. von.* Wien Sb. 61 (1870) (Ab. 2) 797-.

by total reflection. *Kohlrausch, F.* [1877-78] Würzb. Ps. Md. Vh. 12 (1878) 103-; A. Ps. C. 4 (1878) 1-.

— — — — *Quincke, G. H.* Halle Nf. Gs. Festschr. (1879) 321-.

— — — — *Meyer, O. E.* Bresl. Schl. Gs. Jbr. (1889) 111.

Wollaston's method, modification. *Kohlrausch, F. A.* Ps. C. 16 (1882) 603-.

REFRACTIVE INDICES OF VARIOUS SUBSTANCES.

acids. *Willigen, V. S. M.* van der. Harl. Arch. Ms. Teyl. 2 (1869) 238-.

air. *Chappuis, J., & Rivière, C.* C. R. 102 (1886) 1461-.

alcohol and aniline. *Johst, W.* A. Ps. C. 20 (1883) 47-.

— — glycerin solutions. *Willigen, V. S. M.* van der. Harl. Arch. Ms. Teyl. 2 (1869) 199-.

alcoholic solution of fuchsine. *Christiansen, C. A.* Ps. C. 141 (1870) 479-.

alums (for various wave-lengths). *Soret, C.* C. R. 99 (1884) 867-, 1000; 101 (1885) 156-.

aniline red. *Christiansen, C.* Kjøb. Ov. (1871) 5-.

aqueous solutions. *Damien, B. C.* C. R. 91 (1880) 323-.

argon and helium. *Rayleigh, (Lord).* Nt. 52 (1895) 533; R. S. P. 59 (1896) 198-.

benzene. *Willigen, V. S. M.* van der. Harl. Arch. Ms. Teyl. 2 (1869) 218-.

— — *Vostokov, I. A.* Vars. S. Nt. Tr. (1891-92) (C. R., Ps. C.) No. 8, 13-.

— — *Bernackj, V.* [1891-92] Vars. S. Nt. Tr. (Mm.) 2 (1892) No. 5, 58 pp.; Feschr. Ps. (1891) (Ab. 2) 53; Vars. S. Nt. Tr. (1892-93) (C. R., Ps. C.) No. 1, 15-.

bismuth nitrate solution. *Ditscheiner, L.* Wien Sb. 49 (1864) (Ab. 2) 326-.

bodies gaseous at ordinary temperatures only. *Leroux, F. P.* A. C. 61 (1861) 385-.

bromine. *Rivière, C.* C. R. 131 (1900) 671-.

cadmium salt-solutions. *Muyne, R. de. A.* Ps. C. 53 (1894) 559-.

calcium chloride solutions. *Bremer, G. J. W.* Arch. Néerl. 5 (1900) 202-.

compound ethers. *Long, J. H.* Am. J. Sc. 21 (1881) 279-.

cyanogen. *Chappuis, J., & Rivière, C.* C. R. 104 (1887) 1433-.

for D line of dry air from astronomical observations. *Comstock, G. C.* Washburn Obs. Pb. 9 (1896) 202.

ebonite. *Perry, J., & Ayrton, W. E.* L. Ps. S. P. 4 (1881) 345-; Ph. Mg. 12 (1881) 196-.

ethyl ether. *Oudemans, A. C. (jun.)* Amst. Ak. Vs. M. 1 (1885) 426-; Delft Éc. Pol. A. 3 (1887) 1-.

— — near critical point. *Golicyn, (Prince) B., & Wilip, J.* St. Pét. Ac. Sc. Bil. 11 (1900) 117-.

fluorite, in infra-red. *Paschen, F. A.* Ps. C. 56 (1895) 762-.

fused salts. *Arons, L.* A. Ps. C. 53 (1894) 95-.

gases (liquefied). *Bleekrode, L.* A. Ps. C. 8 (1879) 400-; R. S. P. 37 (1884) 339-.

— — *Rivière, C., & Chappuis, J.* Par. S. Ps. Sé. (1886) 188.

— (liquefied). *Chappuis, J.* C. R. 114 (1892) 286-.

— — Arago's interference apparatus. *Cornu, A.* (ix) Par. S. Philm. Bil. 4 (1867) 2-.

— — under high pressure. *Chappuis, J., & Rivière, C.* C. R. 96 (1883) 699-; Par. S. Ps. Sé. (1883) 193-.

— — and vapours. *Mascart, É. É. N.* C. R. 86 (1878) 321-.

glass, influence of temperature. *Pulfrich, C. A.* Ps. C. 45 (1892) 609-.

— — and quartz. *Quincke, G. H.* Edinb. R. S. P. 9 (1878) 567-.

glycerin solutions. *Strohmer, F.* Wien Az. 20 (1883) 237-.

hydrophane saturated with liquids. *Šček-lajev, J. A.* Ps. C. 64 (1898) 325-; 65 (1898) 745.

ice. *Meyer, G.* A. Ps. C. 31 (1887) 321-.

Iceland spar. *Dufet, —.* Par. S. Ps. Sé. (1894) 95-.

liquid nitrogen and air. *Living, G. D., & Dewar, J.* Ph. Mg. 36 (1893) 328-.

— — oxygen, nitrous oxide and ethylene. *Living, G. D., & Dewar, J.* Ph. Mg. 34 (1892) 205-.

liquids. *Bequerel, E., & Cahours, A.* C. R. 11 (1840) 867-.

— — *Damien, B. C.* Par. Éc. Norm. A. 10 (1881) 233-.

— — (relations between compressibility and refractive indices). *Quincke, G. A.* Ps. C. 44 (1891) 774-.

— — of feeble dispersion. *Willigen, V. S. M.* van der. [1867] Harl. Arch. Ms. Teyl. 1 (1868) 161-.

— — indices greater than 1.8. *Bertrand, É.* Fr. S. Mn. Bil. 11 (1888) 31.

metal chlorides in solution. *Willigen, V. S. M.* van der. Harl. Arch. Ms. Teyl. 2 (1869) 222-.

metals. *Quincke, G.* Pogg. A. 120 (1863) 599-.

metals. *Kundt*, —. [1888] *Gen. S. Ps. Mm.* 30 (1888-90) lxxiii-.

—, *Aubel, E. van.* *Brux. S. Sc. A.* 24 (1900) (Pt. 1) 64-.

mica and pennine. *Haidinger, W.* *Wien Sb.* 14 (1854) 330-.

mineral waters. *Riegler, E.* *Bucarest S. Sc. Bl.* 9 (1900) 251-.

native barium, strontium and lead sulphates, effect of heat. *Arzruni, A.* (xn) *Z. Kr.* 1 (1877) 165-.

optical glass of several kinds. *Mascart, É.* *A. C.* 14 (1868) 144-.

phosphorus dissolved in carbon disulphide. *Whitmell, C. T.* *Nt.* 11 (1875) 307.

potassium nitrate and sodium chloride solutions. *Schmidt, W.* *Pogg. A.* 107 (1859) 539-.

quartz (various kinds). *Dufet, H.* *Par. S. Ps. Sé.* (1890) 193.

—, *Macé de Lépinay, J.* *Mars. Fac. Sc. A.* 5 (1896) *Fasc.* 2, 14 pp.

—, effect of calcination. *Brun, A.* *Arch. Sc. Ps. Nt.* 2 (1896) 657-.

rock-forming minerals (for sodium light). *Zimányi, K.* [1893] *Mag. Tud. Ak. Etk. (Term.)* 23 (1894) No. 2, 72 pp.; *Mth. Nt. B. Ung.* 11 (1894) 189-.

rock salt. *Langley, S. P.* *Am. J. Sc.* 30 (1885) 477-.

—, sylvite and fluorite (for very long wavelengths). *Rubens, H., & Snow, B. W.* *A. Ps. C.* 46 (1892) 529-.

saline solutions. *Beer, A., & Kremers, P.* *Pogg. A.* 101 (1857) 133-.

—, *Bary, P.* *C. R.* 114 (1892) 827-.

sea water. *Soret, J. L., & Sarasin, É.* *Arch. Sc. Ps. Nt.* 21 (1889) 509-.

—, *Manley, J. J.* [1900] *Edinb. R. S. P.* 23 (1902) 35-.

sodium salt solutions. *Willigen, V. S. M. van der.* [1870] (xi) *Haarl. Ms. Teyl. Arch.* 3 (1874) 15-.

several substances. *Powell, B. B. A.* *Rp.* (1850) (pt. 2) 14-.

—, table. *Brewster, (Sir) D.* *QJ. Sc.* 22 (1827) 355-.

—, —, *Herschel, (Sir) J. F. W.* *Edinb. J. Sc.* 10 (1829) 296-.

substitution products of carbonic ether. *Wiedemann, E.* *J. Pr. C.* 114 (1873) 453-.

water (distilled). *Willigen, V. S. M. van der.* *A. Ps. C.* 122 (1864) 191-; *Amst. Vs. Ak.* 16 (1864) 332-.

—, *Croullebois, M.* *C. R.* 70 (1870) 847-, 1022.

—, *(Croullebois).* *Jamin, J.* *C. R.* 70 (1870) 966-.

—, *Brühl, J. W.* *Berl. B.* 24 (1891) 644-.

—, *Walter, B. A.* *Ps. C.* 46 (1892) 423-.

—, carbon disulphide, monobromonaphthalene, terebenthene, alcohol, quartz, fluorite, beryl. *Dufet, H.* *Fr. S. Mn. Bl.* 8 (1885) 171-.

— vapour. *Jamin, J.* *A. C.* 52 (1858) 171-.

white light refracted without sensible dispersion. *Montigny, C.* *Brux. Ac. Bl.* 19 (1865) 177-

REFRACTOMETERS.

Royston-Pigott, G. W. *M. Mer. J.* 5 (1871) 65-.

Abbe, E. *Jena. Sb.* (1879) 35-.

Pulfrich, C. *Z. Instk.* 8 (1888) 47-.

Féry, C. *C. R.* 113 (1891) 1028-; *As. Fr. C. R.* (1892) (Pt. 2) 245-.

Pulfrich, C. *Z. Ps. C.* 18 (1895) 294-; *J. de Ps.* 5 (1896) 73-.

Abbe's. Appel, J. *Ts. Ps. C.* 27 (1888) 164-.

—, *Czapski, S.* *Z. Instk.* 10 (1890) 246-, 269-.

—, *Feussner, W.* *Z. Instk.* 14 (1894) 87-.

—, new arrangements. *Pulfrich, C.* *Z. Instk.* 18 (1898) 107-.

for analysis of oils and butter. *Amagat, E. H., & Jean, F.* *C. R.* 109 (1889) 616-.

Bertrand's. Hausser, W. *Gén. Civ.* 9 (1886) 44-.

for butter experiments. *Poleck, —.* *Bresl. Schl. Gs. Jbr.* (1894) (Ab. 2a) 111-.

differential. *Trannin, H.* *As. Fr. C. R.* (1885) (Pt. 1) 105-.

—, *Doumer, E.* *J. de Ps.* 9 (1890) 191-.

—, *(Zeiss's). Anon.* *Mer. S. J.* (1900) 722-.

—, for liquids. *Hallwachs, W.* *A. Ps. C.* 50 (1893) 577-.

educational *(Zeiss's).* *Anon.* *Mer. S. J.* (1900) 636-.

form. *Royston-Pigott, G. W.* *M. Mer. J.* 16 (1876) 294-.

—, new. *Hallwachs, W.* *Dresden Isis Sb.* (1898) (Ab.) 49-.

with heating arrangement. *Leiss, C.* *Z. Instk.* 19 (1899) 65-.

immersion-*(Zeiss's).* *Anon.* *Mer. S. J.* (1900) 721-.

lens-, for liquids. *Pilčikov, N.* *Par. S. Ps. Sé.* (1889) 61-.

for liquids. *Soret, C.* *Arch. Sc. Ps. Nt.* 19 (1888) 264-.

—, *Sondén, —.* *Nt.* 44 (1891) 478.

— or gases *(Dupré's).* *Pellin, P.* *Par. S. Ps. Sé.* (1889) 85-.

new. *Viola, C.* *Z. Instk.* 19 (1899) 276-.

for solids. *Soret, C.* *C. R.* 95 (1882) 517-; *Arch. Sc. Ps. Nt.* 9 (1883) 5-.

total reflection. *Kohlrausch, F.* *A. Ps. C.* 16 (1882) 609-.

—, *Pulfrich, C.* *A. Ps. C.* 30 (1887) 193-, 487-; 31 (1887) 724-; *Z. Instk.* 7 (1887) 16-, 55-, 392-; *A. Ps. C.* 36 (1889) 561-.

for use with the microscope. *Starke, H. D.* *Ps. Gs. Vh.* (1899) 117-.

using Newton's rings. *Royston-Pigott, G. W.* *R. S. P.* 24 (1876) 393-.

with variable refracting angle. *Pulfrich, C.* *Z. Instk.* 19 (1899) 335-.

for Wollaston's method. *Liebis, T.* *Z. Instk.* 4 (1884) 185-; 5 (1885) 13-.

Wollaston's, improvements. *Cooper, J. T. C.* *S. Mm.* 1 (1841-43) 234-.

- Salt invisible in its mother liquor. *Tomlinson*, C. Ph. Mg. 40 (1870) 328-.
- Shadows under water, effects due to. *Hutchinson*, H. N. [1875] Rugby NH. S. Rp. (1876) 22-.
- Sphere, homogeneous, course of light-rays in. *Lippich*, F. Wien Ak. Sb. 79 (1879) (Ab. 2) 516-.
- , optical property. *Hermann*, L. Zür. Vjschr. 19 (1874) 413-, 428.
- Strophoid, application in geometrical optics. *Loria*, G. N. A. Mth. 16 (1897) 262-.
- Surface images. *Mannoury*, G. N. Arch. Wisk. 4 (1899) 112-.
- Surfaces of 2nd degree, mechanical method of producing. *Plücker*, J. Crelle J. 34 (1847) 357-.
- , optical, production. *Brashear*, J. A. Am. As. P. (1884) 255-.
- , tests for planeness and parallelism. *Gibbs*, W. Am. J. Sc. 50 (1870) 53-.
- Tracing paper for copying drawings. *Lasteyrie*, —. Tilloch Ph. Mg. 47 (1816) 132-.
- Transmission of light through bent tubes. *Babinet*, J. C. R. 15 (1842) 802.
- Transparent bodies, action on differently coloured rays. *Brewster*, (Sir) D. [1815] Edinb. R. S. T. 8 (1818) 1-.
- plates, interference apparatus for testing parallelism. *Czapski*, S. Z. Instk. 5 (1885) 149-.
- Vision through glass plate. *Gergonne*, J. D. [1823] Gergonne A. Mth. 14 (1823-24) 1-.
- Water, scenic effects due to. *Inman*, T. (x) Lpool. Lt. Ph. S. P. 27 (1873) 215-.
- Window-glass, phenomenon with. *Tait*, P. G. Edinb. R. S. P. 11 (1882) 418-.

3030 Spectrometry. Dispersion.

(See also 3800; Chemistry 7310.)

- Coloured light for dark rooms, measurement. *Atney*, (Capt.) W. de W. Phot. J. 10 (1886) 114-, 138-.
- Colours, experiments. *Pownall*, —. Tilloch Ph. Mg. 12 (1802) 42-, 107-.
- , Newton's seven. *Mollweide*, C. Gehlen J. 1 (1806) 651-.
- , physical investigations. *Venturi*, G. Mod. S. It. Mm. 8 (1799) 699-.
- , prismatic. *Tenney*, S. [1792] Bost. Mm. Am. Ac. 2 (1793) 37-.
- , —. *Mons*, J. B. van. (vi Add.) V. Mons J. C. 6 (1804) 106-, 242-.
- Dispersionmeter, construction. *Mousson*, A. Sch. Gs. Vh. 55 (1872) 183-.

DISPERSION.

- Rudberg*, F. Pogg. A. 9 (1827) 483-.
- Amici*, G. B. Pogg. A. 35 (1835) 609-.
- Hunt*, E. B. Silliman J. 7 (1849) 364-.
- Christoffel*, E. B. Berl. Mb. (1861) 906-.
- Briot*, C. C. R. 57 (1863) 866-.
- Mathieu*, É. C. R. 59 (1864) 885-; Liouv. J. Mth. 11 (1866) 49-.

- Ricour*, T. C. R. 69 (1869) 1231-; 70 (1870) 115-.
- Willigen*, V. S. M. van der. Harl. Arch. Ms. Teyl. 2 (1869) 308-.
- (Lommel, Glazebrook and Mathieu.) *Ketteler*, E. A. Ps. C. 15 (1882) 613-.
- Kiercker*, C. E. de. [1882-83] Stockh. Ak. Hndl. Bh. 7 (1882-83) No. 1, 54 pp.; C. R. 95 (1882) 588-; Stockh. Ak. Hndl. Bh. 8 (*1883-84) No. 10, 36 pp.; C. R. 97 (1883) 707-.
- of air. *Runge*, C. As. & Asps. 12 (1893) 426-.
- , new method of determining. *Rydberg*, J. R. Stockh. Öfv. (1893) 693-; Föchr. Ps. (1893) (Ab. 2) 46.
- chromatic. *Petrushevskij*, T. Rs. Ps.-C. S. J. 28 (Ps.) (1896) 91-; Föchr. Ps. (1896) (Ab. 2) 38.
- , laws. *Ponton*, M. [1859] Ph. Mg. 19 (1860) 165-, 263-, 364-.
- , — (Ponton). *Stewart*, B. Ph. Mg. 20 (1860) 143-.
- , —. *Ponton*, M. Ph. Mg. 20 (1860) 253-.
- of colourless transparent media. *Wüllner*, F. H. A. A. A. Ps. C. 17 (1882) 580-.
- determination with very small prisms. *Babinet*, J. C. R. 21 (1845) 513-.
- and deviation, mode of increasing. *Kohlrausch*, F. A. Ps. C. 143 (1871) 147-.
- of diamond. *Schrauf*, A. A. Ps. C. 22 (1884) 424-; 26 (1885) 644.
- fluorite. *Langley*, S. P. Smiths. I. Asps. Obs. A. 1 (1900) 219-.
- formulas. *Powell*, B. Ph. Mg. 9 (1836) 116-.
- , *Mascart*, É. Par. Éc. Norm. A. 1 (1864) 263-.
- , *Carvalho*, E. [1900] Sc. Abs. 4 (1901) 488.
- with only 2 constants. *Lommel*, E. C. J. Erlang. Ps. Md. S. Sb. 11 (1879) 191-.
- , experimental proofs. *Brühl*, J. W. Lieb. A. 236 (1886) 233-.
- of gases. *Ketteler*, E. Berl. Mb. (1864) 630-.
- , *Croullebois*, M. C. R. 68 (1869) 778-.
- , *Mascart*, É. É. N. C. R. 78 (1874) 679-.
- glass. *Barlow*, P. Phil. Trans. (1827) 231-.
- , simple and accurate method for ratio. *Stokes*, G. G. R. S. P. 27 (1879) 485-.
- glycerin. *Listing*, J. B. Gött. Nr. (1869) 203-.
- gypsum. *König*, W. A. Ps. C. 69 (1899) 1-.
- Iceland spar. *Carvalho*, E. J. de Ps. 9 (1900) 465-.
- laws. *Ketteler*, E. A. Ps. C. 7 (1879) 658-.
- , *Mouton*, L. C. R. 88 (1879) 1189-.
- , *Hesse*, O. A. Ps. C. 11 (1880) 871-.
- , *Lommel*, E. C. J. Erlang. Ps. Md. S. Sb. 13 (1881) 24-.
- , of calorific rays, and measurement of their wave-lengths. *Mouton*, L. A. C. 18 (1879) 145-.
- of liquid oxygen. *Olzewski*, K., & *Witkowski*, A. Cre. Ac. Sc. Bill. (1894) 245-.
- mercuric iodide solution. *Living*, G. D. [1879] Camb. Ph. S. P. 3 (1880) 258-.

- method of measuring in different parts of spectrum. *Mousson, A.* Arch. Sc. Ps. Nt. 45 (1872) 13.
- number of points in spectrum required for exact knowledge. *Willigen, V. S. M. van der.* Harl. Arch. Ms. Teyl. 1 (1868) 275-.
- phenomena (earthquake waves) analogous to. *Rudski, M. P.* [1899] Krk. Ak. (Mt.-Prz.) Rz. 16 (1899) 115-; Cre. Ac. Sc. Bll. (1898) 166-.
- propagation of light-waves with reference to. *Gouy, A.* Liouv. J. Mth. 8 (1882) 335-.
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- , use in lighthouses. *Wigham, J. R.* Dubl. S. Sc. P. 6 (1888-90) 525-.
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- behaviour of fine threads in focus. *Precht, J. J.* Baumgartner Z. 2 (1833) 154-.
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- colour of best definition, instrument to find. *Schroeder, H.* Cztg. Opt. 20 (1899) 113-, 122-.
- concave, focal length by means of microscopes. *Pscheidl, W.* Wien Ak. Sb. 94 (1887) (Ab. 2) 66-.
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- , relation between. *Müller, Joh.* Arch. Sc. Ps. Nt. 48 (1873) 50-.
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- , small, method of finding focal length. *Webb, T. W.* As. S. M. Not. 17 (1856-57) 269-.
- , —, radius of curvature, methods. *Kayser, E.* [1890] Danzig Schr. 7 (1888-91) (Heft 4) xv-.
- curvature, determination. *Oudemans, J. A. C.* As. Nr. 54 (1860) 262-; Amst. Vs. Ak. 11 (1861) 133-.
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- , obliquely crossed. *Thompson, S. P.* [1899] L. Ps. S. P. 17 (1901) 81-; Ph. Mg. 49 (1900) 316-.
- , theory. *Hoorweg, J. L.* Arch. f. Oph. 19 (1873) (Ab. 2) 236-.
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- , *Pendlebury, R.* Mess. Mth. 7 (1878) 129-.
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- — —. *Oudemans, J. A. C.* [1877] Amst. Ak. Vs. M. 12 (1878) 235-; Arch. Néerl. 13 (1878) 149-.
- — —. *Kayser, E.* [1887] Danzig Schr. 7 (1888-91) (Heft 1) xii-.
- — — and definition. *Blakesley, T. H. L.* Ps. S. P. 15 (1897) 178-; Ph. Mg. 44 (1897) 137-.
- — — — (Blakesley). *Gray, A. L.* Ps. S. P. 15 (1897) 186-; Ph. Mg. 44 (1897) 144-.
- — —, Gauss's method. *Levickij, G. V.* Kharkov Mth. S. Com. 3 (1893) 273-; Fsch. Ps. (1893) (Ab. 2) 24.
- — —, and measurement of curvature of mirrors. *Laurent, L. C. R.* 100 (1885) 903-.
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- , new. *Mergier, G. É.* As. Fr. C. R. (1886) (Pt. 1) 100.
- , —, *Everett, J. D. L.* Ps. S. P. 12 (1894) 180-; Ph. Mg. 35 (1893) 333-.
- , —, *Guilloz, T.* As. Fr. C. R. (1895) (Pt. 2) 410-.

- formula. *Gariel, C. M.* As. Fr. C. R. 5 (1876) 140-.
- , *Mandl, M.* Wien Ak. Sb. 99 (1891) (Ab. 2a) 574-.
- , *Plaats, J. D. van der.* [1895] Mbl. Nt. (1895-96) 5-.
- , geometrical representation. *Ocagne, M. d'.* J. de Ps. 4 (1885) 554-.
- , —, *Füchtbauer, G.* Exner Rpm. 26 (1890) 340-.
- , —, *Ocagne, M. d'.* J. de Ps. 1 (1892) 75-.
- , graphical. *Handl, A.* Exner Rpm. 24 (1888) 197-.
- , new, for thick lenses. *Vanni, G.* Rm. R. Ac. Linc. Rd. 6 (1890) (Sem. 1) 510-.
- , simple proof. *Kuhm, M.* Carl Rpm. 10 (1874) 217-.
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- , new. *Gleichen, A. A.* Ps. C. 37 (1899) 646-.
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- , *Cole, R. S.* Ph. Mg. 41 (1896) 216-.
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- holder, new. *Ward, R. H.* Am. S. Mer. P. (1884) 162-.
- , —, *Malassez, L.* Arch. Md. Exp. 1 (1889) 455-.
- , —, *Zimmermann, A.* Z. Instk. 15 (1895) 322-.
- , Westien's universal. *Brunn, A. von.* Arch. Mkr. An. 24 (1885) 470-.
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- oblique passage of light through. *Hermann, L.* A. Ps. C. 153 (1874) 470-.
- , —, —, — (Hermann). *Krüß, A. H.* A. Ps. C. 157 (1876) 335-.
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- refractive index and curvature, simple method. *Tanakadate, A.* Tök. Coll. Sc. J. 1 (1887) 333-.
- simple, for camera or spectacles. *Breton [de Champ], Paul.* C. R. 42 (1856) 542-, 740-.
- , without errors. *Thiesen, M.* Berl. Ps. Gs. Vh. (1895) 83-.
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- , —, "twin." *Anon.* Mer. S. J. 5 (1885) 862.
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- , determination of distances of image and object with. *Bender, C. A.* Ps. C. 157 (1876) 483-.
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- , theory. *Landerer, J.* Les Mondes 7 (1865) 399-.
- , thick, refraction through. *Regnon, (le rév. père) T. de. (xii)* Brux. S. Sc. A. 3 (1879) (Pt. 2) 181-.
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- Grunert, J. A.* Grunert Arch. 6 (1845) 62-, 440-.
- Listing, J. B.* D. Nf. B. 40 (1865) 106-.
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- coaxial, calculation. *Berg, F. J. van den.* Amst. Ak. Vs. M. 9 (1892) 125-; Fsehr. Mth. (1892) 1039.
- , — of rays in, and application to photographic lenses. *Wanach, B.* Z. Instk. 20 (1900) 161-.
- , —, —, —, — (Wanach). *Harting, H.* Z. Instk. 20 (1900) 234-.
- , general equations. *Bueno de Mesquita, J.* [1882] Amst. Ak. Vs. M. 18 (1883) 329-; Arch. Néerl. 18 (1883) 57-.
- coincidence of object and image. *Ahlborn, H.* [1877] Hamb. Nt. Vr. Vh. 2 (1878) 72-.

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- , —, Hasselberg's method. *Czapski, S.* Z. Instk. 9 (1889) 16-.
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- , —, Bessel's method. *Glaznap, S. P.* Rs. Ps.-C. S. J. 17 (Ps.) (1885) 63.
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- , —, — (Leman). *Harting, H. Z.* Instk. 19 (1899) 274-.
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- , for microscopes. *Ewell, M. D. Am. Mer. S. P. 14* (1892) 43.
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- , anamorphoses. *Emsmann, H. Pogg. A. 77* (1849) 571-; 85 (1852) 99-.
- , transformation of plane lines by reflection at. *Terrier, L. [1874] Neuch. S. Sc. Bil. 10* (1876) (*App.*) 3 pp.
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- , focal length determination. *Budden, E. Nt. 52* (1895) 366.
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- , *Piers, H. [1888] N. Scotia I. Sc. P. & T. 7* (1890) 118-.
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- , *Kearton, J. W. L. Ps. S. P. 13* (1895) 32-; *Ph. Mg. 37* (1894) 546-.
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- , polishing. *Schroeder, H. Cztg. Opt. 18* (1897) 142-, 151-.
- , preparation. *Quincke, G. A. Ps. C. 129* (1866) 44-.
- , reflection from. *Fischer, E. G. Berl. Ab. (1814-15) (Mth.) 1-*.
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- , fluid. *Perkins, G. R. Camb. (M.) Mth. M. 1* (1859) 79-.
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- , — — testing. *Martin, A. C. R. 70* (1870) 389-.
- , large, construction. *Kreche, F. W. C. Brux. Ac. Bil. 18* (1851) 363-.
- , preparation by centrifugal force, Latchinoff's method. *Guérout, A. Lum. Élect. 4* (*1881) 70-.
- and spherical, reflection from. *Beeck-Calkoen, J. F. van. Amst. Vh. 1* (1812) 1-.
- , test for use in making. *Heise, C. G. Cztg. Opt. 16* (1895) 49.
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- , figures in. *Svčšnikov, P. I. Kazan S. Nt. (Ps.-Mth.) P. 6* (1888) 8-.
- , glass, multiple images. *Gergonne, J. D. Nancy Tr. S. Sc. (1811-12) 7-*; *Gergonne A. Mth. 5* (1814-15) 283-.
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- , — —. *Bermann, O. A. Ps. C. 127* (1866) 450-.
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- Bertin, A. [1880] A. C. 22* (1881) 472-.
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- , *Govi, G. [1864-67] Tor. Lav. Sc. Fis. Mt. (1869) 67-*; *Tor. At. Ac. Sc. 2* (1866-67) 357-.
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- , —, number of images. *Gallenkamp, W.* *Pogg.* A. 82 (1851) 588-.
- , —, —, —, *Hartmann, J.* *Grunert Arch.* 18 (1852) 55-.
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- , —, —, —, *Klein, H. A.* *Ps. C.* 152 (1874) 506-.
- , —, —, —, *Schubert, H. C. H.* [1881] *Hamb. Mth. Gs. Mt.* 1 (*1889) 18-.
- , —, production of images. *Lefebvre, E.* *J. de Ps.* 8 (1879) 129-.
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- , —, —, theory. *Maurer, H.* *Arch. Mth. Ps.* 9 (1890) 1-.
- , light, new form. *Mallock, A. R. S. P.* 64 (1899) 440-.
- , new applications. *Beck, A.* *Z. Instk.* 7 (1887) 380-.
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- , —, *Levinen, S.* *Helsingf. Öfv.* 34 (1892) 17-; *Fschr. Ps.* (1891) (Ab. 2) 23-.
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— — — *Lubimoff, N.* Les Mondes 31 (1873) 162-.

— — — *Czapski, S. Z.* Instk. 7 (1887) 409-; 8 (1888) 102.

— — — *Farkas, G.* Orv.-Termt. Éts. (Termt. Szak) (1887) 273-, 363-.

as surveying instrument. *Humbert, G. C. R.* 128 (1899) 819-.

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— *Pscheidl, W.* Carl Rpm. 18 (1882) 686-; 19 (1883) 413-.

— *Quesneville, G.* Mon. Sc. 14 (1900) 573-.

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—, American. *Ranyard, A. C.* Ciel et Terre 14 (1893-94) 557-.

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— — —, results to be expected. *Grubb, (Sir) H.* [1899] Dubl. S. Sc. P. 9 (1899-1902) 55.

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— — —, by microscope. *Goring, C. R.* QJ. Sc. 17 (1824) 367-.

— — —, simple. *Varley, S.* Tilloch Ph. Mg. 4 (1799) 87-.

— — —, — *Jacquin, J. von.* Baumgartner Z. 2 (1833) 101-.

— — — and field of view. *Lubimoff, N.* [1872] Mosc. Bil. S. Nt. 45 (pt. 2) (1873) 1-.

— — — — — (Lubimoff). *Bredichin, T.* Mosc. Bil. S. Nt. 45 (pt. 2) (1873) 380-; 46 (pt. 1) (1873) 460-; (xii) Rec. Mth. (Moscou) 6 (1872-73) (Pt. 1) 303-.

— — — — — (Bredichin). *Lubimoff, N.* Mosc. Bil. S. Nt. 46 (pt. 1) (1873) 165-.

— — — — — (Lubimoff). *Bredichin, T.* Carl Rpm. 10 (1874) 54-.

— — — — — and brightness. *Bohn, C.* Z. Mth. Ps. 29 (1884) 25-, 74-.

— — — — —, simple determination. *Waltenhofen, A. von.* [1871] Prag Ab. 5 (1872) 15 pp.

— — —, theorem. *Robinson, T. R.* [1852] Ir. Ac. P. 5 (1850-53) 249-.

— — —, useful. *Strehl, K.* Cztg. Opt. 18 (1897) 171.

— — — and visual angle, instrument for measuring. *Cavalleri, G. M.* (vi Adds.) Majocchi A. Fis. C. 27 (1847) 281-.

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— effects of large and small. *André, C.* *As. Fr. C. R.* (1889) (*Pt. 1*) 254.

— illusion. *Lisleferme, H.* *J. de Ps.* 6 (1877) 339-.

— theory. *Jadanza, N.* *Tor. Ac. Sc. At.* 17 (1881) 714-; 19 (*1883) 769-.

pancratic. *Donders, F. C.* *Donders Ndl. Gast. Oogl. Vs.* 18 (1877) 51-; *Arch. Néerl.* 13 (1878) 99-; *Donders Ndl. Gast. Oogl. Vs.* 18 (1877) 87-.

panorthic, with wide field. *Zschokke, P.* *Cztg. Opt.* 7 (1886) 1-.

possibilities. *Biggs, A. B.* *Tasm. R. S. P.* (1891) 18-.

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Cassegrain, with glass mirror, theory. *Groeben, — von den.* *Cztg. Opt.* 6 (1885) 147-.

— and Gregory, theory. *Macé de Lépinay, J. N. A. Mth.* 18 (1879) 256-.

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metallic alloys for. *Šafařík, A.* *Prag Sb.* (1893) (*Mth.-Nt.*) No. 34, 14 pp.; *Cztg. Opt.* 15 (1894) 207-, 217-, 229-, 241-, 253-, 265-.

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—, large. *Lockyer, W. J. S.* [1897] *Nt.* 57 (1897-98) 200-.

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—, —, Burckhardt's. *Brewster, (Sir) D.* *Tilloch Ph. Mg.* 33 (1809) 290-.

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—, casting. *Potter, R.* *Ph. Mg.* 36 (1850) 13-.

—, — and working, improvements. *Potter, R.* [1830] *Edinb. J. Sc.* 4 (1831) 13-.

—, composition and figuring. *Sollitt, J. D.* *B. A. Rp.* (1853) (*pt. 2*) 10.

—, effects of heat. *Fagnoli, G.* *Bologna Mm. Ac. Sc.* 2 (1850) 439-.

—, polishing. *Rosse, L. Parsons (Earl of).* *B. A. Rp.* (1884) 637-.

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Lick Observatory, colour aberrations. *Strehl, K.* *Cztg. Opt.* 17 (1896) 3-, 14.

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reticule illumination. *Czapski, S.* *Z. Instk.* 5 (1885) 347-.

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for sextants. *Plummer, W. E.* [1899] *Nt.* 61 (1899-1900) 54.

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—, *Steinheil, R.* *Z. Instk.* 12 (1892) 374-, 418-.

—, measurement of distance with. *Jadanza, N.* *Tor. Ac. Sc. At.* 30 (1895) 713-.

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—, new. *Reade, J.* *Tilloch Ph. Mg.* 63 (1824) 20-.

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— —. *Kaempfer*, D. Braunsch. Vr. Nt. Jbr. (10) (1897) 229-.
water-, for seeing mountains. *Adie*, J. Edinb. N. Ph. J. 49 (1850) 117-.
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Zeiss. *Nelson*, E. M. [1894] Mer. S. J. (1895) 360-.
— *Hermann*, —. Königsb. Schr. 36 (1895) [4]-.
— *Mack*, —. [1895] Würtb. Jh. 52 (1896) lxxxii-.
— *Schiff*, J. Bresl. Schl. Gs. Jbr. (1896) (Ab. 2a) 15-.

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Barfuss, F. W. As. Nr. 20 (1843) 17-, 39-.
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Mercklin, C. E. von. Riga Arb. Nf. Vr. 1 (1848) 83-.
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Burnett, W. J. Silliman J. 12 (1851) 56-.
Alquen, F. d'. Rheinl. Westphal. Vh. (1856) 87-.
Gibbons, W. S. J. Mer. Sc. 4 (1856) 299-.
Reinicke, F. Al. D. Nt. Ztg. 2 (1856) 470-.
Thury, [J. M. A.] Bb. Ün. Arch. 8 (1860) 283-.
Perty, M. Bern Mt. (1862) 83-.
Porro, I. Mil. I. Lomb. Rd. 3 (1866) 285-.
Dippel, L. Arch. Mkr. An. 5 (1869) 281-; 9 (1873) 801-.
Abbe, E. M. Mer. J. 14 (1875) 191-, 245-.
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Dippel, L. Humb. 4 (1885) 273-, 306-, 356-.
Dallinger, (Rev.) W. H. Mer. S. J. (1887) 185-.
Polé, A. Rv. Sc.-Ind. 20 (1888) 187-, 169-, 190-; 21 (1889) 217-.
Darwin, C. Mer. S. J. (1889) 454-.
Lamb, J. M. Am. S. Mer. P. 13 (1891) 13-.
Dallinger, (Rev.) W. H. [1893] Quek. Mer. Cl. J. 5 (1894) 210-.
Nelson, E. M. [1894-96] Quek. Mer. Cl. J. 5 (1894) 348-; 6 (1897) 14-, 191-.
Michael, A. D. Mer. S. J. (1897) 97-.
Tatham, J. F. W. [1899-1900] Quek. Mer. Cl. J. 7 (1900) 180-, 299-.
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Sorby, H. C. Mer. S. J. 1 (1878) 1-.
Malassez, L. Par. S. Bl. Mm. 41 (1889) (C. R.) 321-.
Anti-vibration turntray. *Bridgman*, W. K. [1876] Quek. Mer. Cl. J. 4 (1874-77) 209-.
Aplanatic searcher. *Royston-Pigott*, G. W. Phil. Trans. 160 (1870) 591-; QJ. Mer. Sc. 10 (1870) 393-; M. Mer. J. 11 (1874) 153-.

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Nachet, —. J. Mer. Sc. 8 (1860) 156-.
Crisp, F. [1878] Mer. S. J. 2 (1879) 21-.
Russell, J. C. [1878] Mer. S. J. 2 (1879) 25-.
Schröder, H. Mer. S. J. 3 (1883) 813-.
Anthony, J. Mer. S. J. 4 (1884) 697-.
Francothe, P. [1884] Brux. S. Blg. Mer. Bll. 10 (1885) 77-.
Thoma, R. Z. Ws. Mkr. 5 (1888) 297-.
Abbe's, improvements. *Giltay*, E. (xn) Bt. Cb. 12 (1882) 419-.
—, —. *Heinsius*, H. W. Z. Ws. Mkr. 6 (1889) 36-.
—, —. *Anon*. Mer. S. J. (1899) 93.
Ashe's. *Scourfield*, D. J. Quek. Mer. Cl. J. 7 (1900) 413-.
binocular. *Edwards*, A. M. Am. Mer. J. 18 (1897) 256-.
of Doyère and Milne-Edwards, improvement. *Malassez*, L. Par. S. Bl. Mm. 36 (1884) (C. R.) 510-.
Dumaige's. *Anon*. Mer. S. J. (1888) 487-.
erecting. *Nelson*, E. M. [1894] Mer. S. J. (1895) 21-.
Hofmann's. *Hewrick*, H. van. [1878] Brux. S. Blg. Mer. Bll. 5 (*1879) lxvi-.
improved. *Ives*, F. E. Mer. S. J. (1898) 495.
— method of making measurements with. *Sendall*, (Sir) W. Mer. S. J. (1891) 705-.
and microscope, combination. *Weichert*, —. Gilbert A. 41 (1812) 110-.
Nachet's. *Anon*. Mer. S. J. 6 (1886) 1057.
— *Anon*. Mer. S. J. (1893) 99-.
theory and improvement. *Giltay*, E. [1883-84] Ndl. Kruidk. Arch. 4 (*1886) 106-; Z. Ws. Mkr. 1 (1884) 1-.

- use. *Pettigrew, J. B.* Manch. Mer. S. T. (1888) 80-.
- of microscope as. *Fayel, —.* Par. S. Bl. Mm. 38 (1886) (C. R.) 405-.
- in microscopic drawing. *Goethart, J. W. C.* [1892] Ndl. Kruidk. Arch. 6 (1895) 161-; Z. Ws. Mkr. 10 (1893) 466-.
- with variable angle. *Malassez, L.* Par. S. Bl. Mm. 37 (1885) (C. R.) 277-; Par. Lb. Hl. Tr. (1886-87) 7-.
- Zeiss's. *Sykes, M. L.* Manch. Mer. S. T. (1889) 106-.
- Centering glass, Ross's. *Anon.* Mer. S. J. 6 (1886) 681-.
- Compressor. *Hislop, W.* [1856] Mer. S. T. 5 (1857) 159-.
- *Clark, S. M.* Silliman J. 29 (1860) 448-.
- *Monticelli, F. S.* Z. Ws. Mkr. 11 (1894) 454-.
- *Ziegler, H. E.* Z. Ws. Mkr. 14 (1897) 145-.
- , reversible, Davis's ebonite. *Anon.* Mer. S. J. (1899) 337-.
- , —, Macer's. *Anon.* Mer. S. J. (1893) 691-.
- Cover-glass gauge, Beck's. *Anon.* Mer. S. J. (1900) 516.
- Cover-glasses, thin. *Jackson, G. J.* Mer. Sc. 1 (1853) 141-.
- Diaphragms, dispersing. *Unna, P. G.* Z. Ws. Mkr. 3 (1886) 230.
- , graduated. *Coulter, —.* Mm. Md. Mil. 20 (1868) 328-.
- , iris, Zeiss's. *Zimmermann, A.* Z. Ws. Mkr. 4 (1887) 343-.
- , Klönne and Müller's. *Anon.* Mer. S. J. 6 (1886) 680-.
- and mechanical finger. *Griffith, E. H.* Am. S. Mer. P. (1885) 112-.
- , new ocular. *Lighton, W.* [1890] Mer. S. J. (1891) 255-.
- , substage, Griffith's. *Anon.* Mer. S. J. 6 (1886) 130.
- Diatomscope. *Osborne, (Lord) S. G.* Mer. S. J. 4 (1884) 802-, 961.
- , Osborne's. *F., W.* [1884] Mer. S. J. 5 (1885) 128-.
- , —, *Heurck, H. van.* [1884] Mer. S. J. 5 (1885) 129.
- Drawing apparatus. *Bernhard, W.* Z. Ws. Mkr. 9 (1892) 439-.
- , —, *Smith, A. H.* Mer. S. J. (1892) 277-.
- , —, Abbe's, modification. *Bernhard, W.* Z. Ws. Mkr. 8 (1891) 291-.
- , —, construction and new model. *Czapski, S.* Z. Ws. Mkr. 11 (1894) 289-.
- , —, for low powers. *Edinger, L.* Z. Ws. Mkr. 8 (1891) 179-.
- , —, —, *Kaiser, O.* Z. Ws. Mkr. 13 (1896) 163-.
- , —, —, improved form of Edinger's. *Nelson, E. M.* Mer. S. J. (1893) 101-.
- , —, micropantograph. *Roberts, I. M.* Mer. J. 8 (1872) 1-.
- , —, microscopic geometric. *Hilgendorf, F. M.* (xii) Z. Instk. 2 (1882) 459-.
- , —, prism. *Anon.* Mer. S. J. (1887) 650.
- Drawing apparatus, prism. *Piffard, H. G.* Mer. S. J. (1892) 874-.
- , —, Reichert's. *Brauer, F.* Z. Ws. Mkr. 8 (1891) 451-.
- , —, Winkel's. *Henking, H.* Z. Ws. Mkr. 8 (1891) 295-.
- and dissection of objects, new arrangement for. *Brooke, C. B. A. Rp.* (1851) (pt. 2) 7-.
- easel. *Giesenhausen, —.* Z. Ws. Mkr. 7 (1890) 169-.
- and measuring objects, apparatus. *Fick, A.* Henle u. Pfeufer Z. 3 (1853) 273-.
- , projection and photomicrography, Reichert's combined apparatus. *Anon.* Mer. S. J. (1900) 122.
- Electric action, improved arrangement for observation. *Ströbel, O.* (xii) Z. Instk. 2 (1882) 274-.
- Eye-shade. *Ward, R. H.* Am. Mer. J. 5 (1884) 82-.
- , *Hall, L. B.* Science 22 (1893) 94-.
- Finder. *Maltwood, T.* Mer. S. T. 6 (1858) 59-.
- , *Janson, H. U.* J. Mer. Sc. 8 (1860) 199-.
- , *Powell, T.* Dublin Q. J. Md. Sc. 38 (1864) 286-.
- , *Flesch, M. H. J.* Arch. Mkr. An. 20 (1882) 502-.
- ("microstat" or "microtopograph"). *Smirnow, A.* Arch. Mkr. An. 29 (1887) 384-.
- , *Valenti, A.* Z. Ws. Mkr. 10 (1893) 454-.
- , *Stiles, J. H.* [1896] Sc. Mer. S. P. & T. 2 (1900) 96.
- , geometrical. *Vescovi, P. de.* Z. Az. 15 (1892) 203-.
- , nose-piece. *Janson, H. U.* Mer. J. 8 (1860) 269-.
- Finders. *Edwards, A. M.* Mer. J. 5 (1857) 200-.
- and indicators. *Amyot, T. E.* QJ. Mer. Sc. 4 (1856) 151-.
- , use. *Fabre-Domergue, P.* Toul. S. H. Nt. Bl. (1884) 148-.

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- Abbe, E. Arch. Mkr. An. 9 (1873) 469-; M. Mer. J. 13 (1875) 77-.
- Christy, T. S. C. In. J. 7 (1888) 719.
- Reichert, —. Mer. S. J. (1893) 381-.
- Abbe's. *Dippel, L.* Flora 56 (1873) 497-.
- , and apochromatic lenses. *Thanhoffer, L.* Termt. Közl. 20 (1888) (Suppl.) 174-.
- , improved form. *Reichert, C.* Czgt. Opt. 18 (1897) 141-.
- , Koristka's modification. *Martinotti, G.* Z. Ws. Mkr. 2 (1885) 500-.
- , mechanical construction. *Behrens, W.* Z. Ws. Mkr. 1 (1884) 409-.
- achromatic light-filter for high powers. *Eisen, G.* Z. Ws. Mkr. 14 (1897) 444-.
- black shadow. *Royston-Pigott, G. W. M.* Mer. J. 11 (1874) 246-.
- cell. *Jacobs, F. O.* Mer. S. J. (1890) 795.
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—, *Lighton*, W. [1878] (xn) Am. Mer. J. 1 [(1878-79)] 42-.

—, *Mayer*, A. M. Mer. S. J. 6 (1886) 514-.

—, *Nachet*, —. Mer. S. J. (1887) 463.

direct, *Sorby's*. *Anon.* Mer. S. J. 6 (1886) 130-.

glass-rod. *Maddox*, —. Mer. S. J. (1890) 101-.

immersion-. *Mayall*, J. Mer. S. J. 2 (1879) 27-.

—, catadioptric. *Stephenson*, J. W. Mer. S. J. 5 (1885) 207-.

—, —, *Stephenson's*. *Anon.* Mer. S. J. 5 (1885) 523.

—, catoptric. *Stephenson*, J. W. Mer. S. J. 2 (1879) 36-.

—, paraboloid. *Edmunds*, J. [1877] Quek. Mer. Cl. J. 5 (1878-79) 17-.

—, stage. *Mayall*, J. Mer. S. J. 2 (1879) 837-.

iris. *Ward*, R. H. Am. S. Mer. P. (1884) 160-.

method of adjusting. *Zimmermann*, A. Z. Ws. Mkr. 8 (1891) 454-.

monochromatic. *Nelson*, E. M. [1891] Mer. S. J. (1891) 443-; (1892) 1-.

—, *Zeiss's*. *Anon.* Mer. S. J. 6 (1886) 515.

paraboloid. *Edmunds*, J. M. Mer. J. 18 (1877) 78-.

—, *Wenham*, F. H. (xn) Am. Mer. J. 1 [(1878-79)] 186-; 1 (1880) 101-.

—, *Moore*, A. J. Mer. S. J. 4 (1884) 453-.

—, *Anon.* Mer. S. J. 4 (1884) 454.

prism, achromatic. *Edwards*, A. M. N. Y. Lyceum P. 1 (1873) 299-.

—, binocular, improved form of *Stephenson's*. *Ahrens*, C. D. Mer. S. J. 5 (1885) 959.

—, diatom, and true form of diatom markings. *Reade*, J. B. M. Mer. J. 2 (1869) 5-.

—, doubly reflecting. *Gray*, P. Mer. J. 1 (1861) 273-.

—, erecting. *Nachet*, —. J. Mer. Sc. 8 (1860) 206-.

—, *Nachet's*. *Shadbolt*, G. [1850] Mer. S. T. 3 (1852) 74-.

—, revolver immersion. *Edmunds*, J. Mer. S. J. 2 (1879) 32-.

reflex, for high powers. *Wenham*, F. H. M. Mer. J. 7 (1872) 237-.

simple. *Edwards*, A. M. Mer. S. J. (1893) 286-.

— (Edwards). *Maddox*, R. L. Mer. S. J. (1893) 423.

superstage. *Goodwin*, W. [1889] Quek. Mer. Cl. J. 4 (1892) 70-.

theory. *Fripp*, H. E. Mer. S. J. 2 (1879) 503-; 3 (1880) 742-.

on total reflection principle. *Kochs*, W. Arch. Mkr. An. 32 (1888) 683-.

for transparent objects. *Harting*, P. Ndl. Lancet 6 (1850-51) 457-.

traverse-lens. *Tolles*, R. B. Mer. S. J. 2 (1879) 388-.

universal reflecting. *Bridgman*, W. K. [1876] Quek. Mer. Cl. J. 4 (1874-77) 214-.

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vertical. *Stephenson*, J. W. Mer. S. J. 2 (1879) 266-.

—, *Forgan*, W. [1896]. Sc. Mer. S. P. & T. 2 (1900) 56-.

—, diaphragm for Beck's. *Anon.* Mer. S. J. 5 (1885) 522-.

Wenham half-disk. *Dayton*, R. (xn) Am. S. Mer. P. (1882) 161-.

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Bausch, E. Mer. S. J. 4 (1884) 623.

Wallich, G. C. [1884] Mer. S. J. 5 (1885) 127-.

Nelson, E. M. Mer. S. J. 5 (1885) 327.

achromatic. *Curties*, C. L. Mer. S. J. (1900) 532.

—, *Baker's*. *Anon.* Mer. S. J. (1900) 512-.

—, *Beck's*. *Anon.* Mer. S. J. (1899) 338-.

—, and new method of illuminating opaque objects. *Riddell*, J. L. Silliman J. 15 (1853) 69.

annular. *Shadbolt*, G. [1850] Mer. S. T. 3 (1852) 132-.

apochromatic. *Mayall*, J. (jun.) Mer. S. J. (1889) 609.

—, *Powell* and *Lealand's*. *Anon.* Mer. S. J. (1889) 125-.

—, substage, with collar-correction. *Nelson*, E. M. Mer. S. J. (1895) 229-.

Bausch and *Lomb's*. *Anon.* Mer. S. J. (1887) 648.

bull's eye. *Nelson*, E. M. Mer. S. J. (1891) 309-.

—, —, doublet, new form. *Nelson*, E. M. Mer. S. J. (1896) 365-.

cone and immersion paraboloid. *Swift*, J. Mer. S. J. 5 (1885) 126-.

"desideratum." *Miles*, J. L. W. Manch. Mer. S. T. (1886) 31-.

with 2 diaphragm plates, *Beck's*. *Anon.* Mer. S. J. 4 (1884) 124.

homogeneous objective. *Lighton*, W. Am. Mer. J. 15 (1894) 59-.

improved. *Bridgman*, W. K. Quek. Mer. Cl. J. 4 (1874-77) 311-.

oil immersion, *Beck's* new wide-angle. *Anon.* Mer. S. J. (1900) 254.

—, —, equalising thickness of slips with. *Nelson*, E. M. [1885] Mer. S. J. 6 (1886) 131.

old Gillett, with collar adjustment. *Nelson*, E. M. Mer. S. J. (1899) 679.

Reichert's. *Moeller*, J. Z. Ws. Mkr. 2 (1885) 339-.

substage. *Leach*, W. Manch. Mer. S. T. (1888) 76-.

—, *Maddox*, R. L. [1889] Mer. S. J. (1890) 99-.

—, *Nelson*, E. M. [1890] Quek. Mer. Cl. J. 4 (1892) 116-.

—, *Hyatt*, —. Mer. S. J. (1891) 256-.

and substage, *Bausch* and *Lomb's*. *Anon.* Mer. S. J. (1887) 809.

substage and diaphragm. *Czapski*, S. Z. Ws. Mkr. 11 (1894) 433-.

—, *Kellner* eye-piece as. *Maddox*, R. L. Mer. S. J. 4 (1884) 801-.

substage, Swift's. *Anon.* Mer. S. J. (1900) 718-.
 —, Watson's. *Anon.* Mer. S. J. (1900) 119-.
 Wallich's. *Anon.* Mer. S. J. 4 (1884) 962-.

Illuminators: Lamps.

Drosten, R. *Brux.* S. Blg. Mer. Bl. 14 (1888) 171-.
acme. *Queen*, J. W. Mer. S. J. 6 (1886) 1053-.
arc-, projection, Zeiss's. *Anon.* Mer. S. J. (1900) 381-.
Baker's. *Anon.* Mer. S. J. 6 (1886) 688.
Beck's complete. *Anon.* Mer. S. J. 4 (1884) 628-.
chimney for. *Nelson*, E. M. Mer. S. J. (1894) 108-.
electric. *Flesch*, M. Z. Ws. Mkr. 1 (1884) 561-.
 —. *Poulsen*, V. A. [1884] Kjöb. Bt. F. Mdd. 1 (1882-86) 144-.
 — (Poulsen's). *Anon.* Bt. Not. (1885) 106-.
 —. *Barnard*, J. E. [1899] Mer. S. J. (1900) 118.
 —. *Roussellet*, C. F. Mer. S. J. (1900) 741-.
 — *incandescent*. *Stearn*, C. H. Mer. S. J. 3 (1883) 29-.
 — —. *Stein*, T. Z. Ws. Mkr. 1 (1884) 161-.
 — — (Stein). *Heurck*, H. van. Z. Ws. Mkr. 1 (1884) 419-.
 — —. *Anon.* Mer. S. J. 6 (1886) 1053.
 —, *Trouvé-Helot*. *Mayall*, J. (jun.) Mer. S. J. 5 (1885) 1121-.
Goodwin's. *Nelson*, E. M. Mer. S. J. (1897) 90.
incandescent, *Auer*. *Bürkner*, K. Z. Ws. Mkr. 4 (1887) 35-.
 —, *burning carburetted air*. *Regnard*, P. Par. S. Bl. Mm. 34 (*1882) (C. R.) 177-.
Koch-Wolz. *Schiefferdecker*, P. Z. Ws. Mkr. 7 (1890) 450-; 8 (1891) 53.
monochromatic. *Brewster*, (Sir) D. [1822] *Edinb.* R. S. T. 9 (1823) 433-.
Nelson's. *Anon.* Mer. S. J. 4 (1884) 125.
 —, *improved form*. *Swift*, J. Mer. S. J. (1895) 393.
Nelson-Mayall. *Mayall*, J. (jun.) Mer. S. J. 4 (1884) 286-.
reflector. *Koch*, W., & *Wolz*, M. [1887] Mer. S. J. (1888) 1025-.
Rühe's. *Fricke*, A. C. Ztg. 9 (1885) 1338.
Schieck's. *Anon.* Mer. S. J. (1888) 490-.
shade. *Quimby*, B. F. Mer. S. J. (1887) 463.

Immersion heating apparatus. *Julien*, A. A. [1885] Mer. S. J. (1887) 466.
Inclining a preparation, instrument for. *Jagger*, T. A. (jun.) Am. J. Sc. 3 (1897) 129-.
Indicator. *Bailey*, J. W. *Silliman J.* 20 (1855) 58-.
 —. *Schmidt*, Ad. *Halle Z. Nw.* 33 (1869) 465-.
 — for small objects. *Ballé*, L. Rouen S. Sc. Bl. (1894) 216-.
Indicators. *Pantocsek*, J. Z. Ws. Mkr. 5 (1888) 39-.
 —, *focus*-. *Griffith*, E. H. Am. S. Mer. P. 13 (1891) 47-.
Lens- and slide-holder, *Hippisley's*. *Anon.* Mer. S. J. 6 (1886) 129-.

Lieberkühn stops. *Giles*, G. W. M. Mer. S. J. 6 (1886) 681.
Measuring apparatus. *Lindau*, G. [1889] Mer. S. J. (1891) 252-.
 — for small inequalities. *Sandberger*, G. Pogg. A. 85 (1852) 97-.
Mechanical finger. *Smith*, H. L. Am. J. Sc. 41 (1866) 331-.
Micromegascope. *Matthews*, J. Quek. Mer. Cl. J. 5 (1878-79) 167-.

Micrometers and Micrometry.

Harting, P. *Hoeven en Vriese Ts.* 7 (1840) 165-.
Jackson, G. [1847] Mer. S. T. 2 (1849) 134-.
Robertson, W. *Edinb. M. J. Md. Sc.* 12 (1851) 329-.
Jackson, G. J. Mer. Sc. 4 (1856) 241-.
Petruschewsky, F. Pogg. A. 107 (1859) 633-.
Burch, G. J. [1878] Quek. Mer. Cl. J. 5 (1878-79) 45-.
Baumann, T. Z. Instk. 4 (1884) 149-.
Love, E. G. [1895] Mer. S. J. (1896) 245-.
Berger, H. Z. Ws. Mkr. 15 (1898) 303-.
adjustment. *Förster*, W. (xii) Z. Instk. 1 (1881) 7-, 119-.
best form. *Jackson*, G. J. Mer. Sc. 2 (1854) 129-.
comparison and regulation. *Ettingshausen*, A. von. *Baumgartner Z.* 5 (1829) 316-.
dynameter-, useful form (kratometer). *Royston-Pigott*, G. W. M. Mer. J. 5 (1871) 79-.
measurements. *Ewell*, M. D. Mer. S. J. (1889) 447.
 —, *variation due to curvature of cover-glass*. *Ewell*, M. D. Am. S. Mer. P. 12 (1890) 79-.
 —, — — — *focusing*. *Hirsch*, A. Par. Poids et Mes. PV. (*1877) 255-.
 —, — — —. *Bosscha*, J. Delft Éc. Pol. A. 2 (1886) 89-.
 —, — — — and *inclination*. *Foerster*, W. Par. Poids et Mes. PV. (*1877) 269-.
 —, — — — *different illumination*. *Fasoldt*, C. Mer. S. J. (1888) 814.
new method. *Gibbons*, W. S. [1858] Mer. S. T. 7 (1859) 31-.
 —. *Matthews*, J. Quek. Mer. Cl. J. 1 (1868-69) 231-.
Petruschewsky's. *Knorr*, E. Pogg. A. 111 (1860) 125-.
screw, differential. *Betz*, G. W. *Cztg. Opt.* 19 (1898) 181-.
 —, and *glass micrometer eye-piece combined*. *Koch*, A. Z. Ws. Mkr. 6 (1889) 33-.
 —, *new arrangement*. *Mohl*, H. von. Arch. Mkr. An. 1 (1865) 79-.
 —, — *model*. *Schiefferdecker*, P. Z. Ws. Mkr. 3 (1886) 1-.
stage-, *aërial*. *Royston-Pigott*, G. W. [1872] M. Mer. J. 9 (1873) 2-, 51-.
 —, *Fasoldt*. *Mendenhall*, T. C. (xii) Am. S. Mer. P. (1882) 201-.
 —, 2 *new forms*. *Ewell*, M. D. Am. S. Mer. P. 12 (1890) 76-.

- Moist gas chambers, history. *Kühne, W. J.* Pr. C. 17 (1878) 240, 288.
- Nose piece adapter, Dumaige's. *Anon.* Mer. S. J. (1888) 488.
- , Jung's. *Anon.* Mer. S. J. 6 (1886) 132-.
- , adapters. *Anon.* Mer. S. J. 4 (1884) 284.
- , —. *Thury, M.* Mer. S. J. 4 (1884) 445.
- , centering and focusing. *Frazer, A.* [1886] Sc. S. Arts T. 11 (1887) 345-.
- , Fasoldt's. *Anon.* Mer. S. J. 4 (1884) 959.
- , and objective, standard screw thread for. *Beck, C.* Mer. S. J. (1896) 389-.
- , revolving. *Henneguy, —.* Par. S. Bl. Mm. 37 (1885) (C. R.) 700.
- , sliding, improved form. *Turnbull, J. M.* [1886] Sc. S. Arts T. 11 (1887) 352-.
- Object pusher, simple. *Mayer, P. Z. Ws.* Mkr. 17 (1900) 7-.
- Objects, apparatus for marking. *Schieffer-decker, P. Z. Ws.* Mkr. 3 (1886) 461-.
- Oxyhydrogen apparatus. *Stratingh, S. Mulder* Arch. 5 (1837) 161-.
- Polarising apparatus. *Thompson, S. P.* Mer. S. J. (1889) 617-.
- , *Ebner, V. von.* Z. Ws. Mkr. 9 (1892) 161-.
- , *Amici's.* *Madan, H. G.* Mer. S. J. 6 (1886) 682-.
- , distinctness of vision. *Brewster, (Sir) D.* Ph. Mg. 32 (1848) 161-.
- Prism, analysing, and goniometer, Boecker's holder for. *Anon.* Mer. S. J. 5 (1885) 705.
- Ruling machine, Nobert's. *Mayall, J. (jun.)* Mer. S. J. 5 (1885) 377-, 580.
- Scale and pointer. *Bridgman, W. K. J.* Mer. Sc. 5 (1857) 206-.
- Screen. *Wray, L. (jun.)* Mer. S. J. 4 (1884) 956-.
- , *Schiefferdecker, P. Z. Ws.* Mkr. 9 (1892) 180-.
- , breath. *Schiemenz, P. Z. Ws.* Mkr. 6 (1889) 37-.
- , use. *Schmidt, Ad.* Hedw. 8 (1869) 130.
- Slide, aluminium. *Heidenhain, M. Z. Ws.* Mkr. 13 (1896) 166-.
- , current-. *Parsons, P. B.* Mer. S. J. 4 (1884) 121-.
- , holder. *Fabre-Domergue, —.* A. Mergr. 6 (1894) 84-.
- , with movable capillary tube. *Chabry, L.* Par. S. Bl. Mm. 38 (1886) (C. R.) 322-.
- , parabolised gas-. *Edmunds, J.* Mer. S. J. 3 (1880) 585-.
- , short, as safety slide. *Shimer, H.* [1891] Mer. S. J. (1892) 567-.
- , simple means for distinguishing details in. *Bolsius, (le rév. père) —.* Brux. S. Sc. A. 19 (1895) (Pt. 1) 80-.
- Slides, canary glass for. *Brücke, E.* Wien SB. 21 (1856) 430-.
- , glass for. *Donders, F. C.* Ndl. Lancet 5 (1849-50) 309-.
- , for opaque objects with removable cover. *Scott, D. B.* [1899] Quek. Mer. Cl. J. 7 (1900) 167-.
- Slides with pillars for micro-chemical reactions. *Nunn, R. J.* [1883] Mer. S. J. 4 (1884) 123-.
- Spark apparatus, Stokes's. *Anon.* Mer. S. J. 4 (1884) 964-.
- , Stokes-Watson electric. *Anon.* Mer. S. J. 5 (1885) 1069-.
- Spot-lens mounting, Queen's. *Anon.* Mer. S. J. 4 (1884) 452-.
- Substage apparatus, Beck's combined. *Anon.* Mer. S. J. 5 (1885) 115-.
- Turntable, improved. *Dunning, C. G.* [1890] Quek. Mer. Cl. J. 6 (1879-81) 81-.
- Turntables, 3. *Griffith, E. H.* Am. S. Mer. P. (1885) 112-.
- Universal accessory, Bausch and Lomb's, to replace substage. *Anon.* Mer. S. J. 5 (1885) 713.
- , carrier. *Bolsius, (le rév. père) H.* Brux. S. Sc. A. 15 (1891) (Pt. 1) 42-; 21 (1897) (Pt. 2) 87-.
- Zeiss's new apparatus. *Drosten, R.* Brux. S. Blg. Mer. Bll. 21 (1894) 52-.
- Achromatic combination for use with blue light. *Stoney, G. J.* QJ. Mer. Sc. 11 (1871) 212-.
- Achromatism. *Airy, G. B.* [1824] Camb. Ph. S. T. 2 (1827) 227-.
- Adaptations. *Rood, O. N.* Silliman J. 21 (1856) 106-.
- Aplanatic power; and new double-star and image tests. *Royston-Pigott, G. W. M.* Mer. J. 4 (1870) 254-.
- Binocular vision. *Wenham, F. H.* [1853] Mer. S. T. 2 (1854) 1-.
- , *Smith, H. L.* Am. J. Sc. 38 (1864) 111-.
- , *Carpenter, —.* Mer. S. J. 4 (1884) 486-.
- Choice of microscope. *Mohl, H. von.* Bt. Ztg. 1 (1843) 305-.
- , —. *Schleiden, M. J.* Forriep Not. 4 (1847) 1-.
- , —. *Nave, J.* Brünn Jh. Nw. Sect. (1859) (Sb.) xv-.
- , —. *Areschoug, J. E.* Bt. Not. (1867) 25-.
- Coarse adjustment, application of Mayall's stepped diagonal rackwork. *Anon.* Mer. S. J. 4 (1884) 959-.
- , rackwork. *Nelson, E. M.* Mer. S. J. (1899) 256-.
- Colour contrast between object and background, optically produced. *Rheinberg, J.* Mer. S. J. (1896) 373-.
- , effects on boundaries of colourless objects. *Ambrohn, H.* Leip. Mth. Ps. B. 48 (1896) 134-.
- , studies. *Slack, H. J.* Pop. Sc. Rv. 14 (1875) 126-.
- Cover glass thickness, correction. *Bausch, E.* Am. S. Mer. P. 12 (1890) 43-.
- , —, estimation. *Royston-Pigott, G. W.* M. Mer. J. 8 (1872) 269-.
- , —, and tube length, correction. *Gage, S. H.* Am. S. Mer. P. (1887) 168-.
- , —, —, —. *Poli, A.* Rv. Sc.-Ind. 21 (1889) 65-.

- Dispersion. *Nelson, E. M.* Mer. S. J. (1899) 121-.
- Elevations and depressions, discrimination. *Welcker, H.* Henle u. Pfeufer Z. 7 (1859) 63-.
- Evolution of microscope. *Smolik, J.* Živa 9 (1861) 299-.
- — —. *Blackham, G. E.* (xin) Am. S. Mer. P. (1882) 25-.
- — —. *Lamb, J. M.* Am. Mer. J. 12 (1891) 273-.
- — —. *Nelson, E. M.* [1897-98] Quek. Mer. Cl. J. 6 (1897) 349-; 7 (1900) 98-.
- — —, origin and uses. *Clinch, J. W.* [1896] Yn Lioar Manninagh 3 (1902) 49-.
- Field of view, large, to obtain. *Forgan, W.* [1900] Sc. Mer. S. P. & T. 3 (1904) 32-.

FINE ADJUSTMENT.

- Czapski, S.* Z. Ws. Mkr. 3 (1886) 207-.
- Anon.* Mer. S. J. 6 (1886) 686-.
- Griffith, E. H.* Am. S. Mer. P. 10 (1888) 161-.
- (Watson's.) *Anon.* Mer. S. J. (1893) 93-.
- Marpmann, G.* Z. Angew. Mkr. 4 (1899) 86-.
- Stringer, E. B.* Mer. S. J. (1900) 419-.
- cam. *Cutter, E.* Mer. S. J. 6 (1886) 1041-.
- Campbell's. Nelson, E. M.* Mer. S. J. 6 (1886) 324-.
- and coarse, Ross's screw and pinion. *Anon.* Mer. S. J. (1889) 691-.
- differential screw, *Schröder's.* *Anon.* Mer. S. J. 6 (1886) 685-.
- double action, *Anderson's.* *Anon.* Mer. S. J. 6 (1886) 325-.
- evolution. *Nelson, E. M.* Mer. S. J. (1899) 366-.
- hydrostatic. *Nelson, E. M.* [1884] Quek. Mer. Cl. J. 2 (1886) 57-.
- "jewelled." *Mayall, J. (jun.)* Mer. S. J. (1890) 507-.
- lever and parallel spring, *Swift's.* *Anon.* Mer. S. J. (1887) 608-.
- for substage. *Karop, G. C.* Mer. S. J. (1892) 421-.
- tangent screw, *Hilger's.* *Anon.* Mer. S. J. (1887) 461-.

- Focus, means of changing. *Govi, G.* C. R. 84 (1877) 341-.
- — —. *Anon.* Mer. S. J. 5 (1885) 1057.
- — —. *Neuhauss, R.* Mer. S. J. (1888) 809.
- — —. *Lucas, K.* Mer. S. J. (1899) 139-.
- Focusing up or down too much, effect. *Maskell, W. M.* [1888] Mer. S. J. (1889) 134-.
- Gavino's modification. *Trouessart, —, & Duplouch, —.* Par. S. Bl. Mm. 48 (1896) (C. R.) 1088-.
- Glass, action of bleaching agents. *Whelpley, H. M.* Mer. S. J. (1889) 314-.
- , cut lines in, optical appearance. *Slack, H. J.* M. Mer. J. 5 (1871) 213-.
- scales. *Nobert, F. A.* As. Nr. (1849) (Er-gänz. Heft) 93-.

- Hairs, visibility, etc. *Slack, H. J.* Mer. S. J. 1 (1878) 318-.
- Heat-measurements. *Engelmann, T. W.* Ndl. Arch. Ntk. 3 (1868) 506-; Arch. Mkr. An. 4 (1868) 334-.

ILLUMINATION.

(See also *Illuminators under Accessories.*)

- Brewster, (Sir) D.* [1831-40] Edinb. J. Sc. 6 (1832) 83-; B. A. Rp. (1840) (pt. 2) 9-.
- Bergin, T. F.* Ir. Ac. P. 5 (1853) 313-.
- Wenham, F. H.* J. Mer. Sc. 2 (1854) 145-.
- Higgins, J. F.* [1869] QJ. Mer. Sc. 10 (1870) 150-.
- Barker, J.* [1870] Ir. Ac. P. 1 (1873-74) 7-.
- Nelson, E. M.* [1884] Mer. S. J. 5 (1885) 713-.
- Tatham, J.* Manch. Mer. S. T. (1886) 78-.
- by air-bubbles. *Brevoort, H. L.* [1885] Mer. S. J. 6 (1886) 324-.
- albo-carbon. *Malassez, L.* Par. Lb. Hl. Tr. (1886-87) 28-.
- and aplanatic definition. *Royston-Pigott, G. W.* M. Mer. J. 4 (1870) 296-.
- by artificial light. *Griffith, J. W.* A. NH. 12 (1843) 481.
- — —. *Rainey, G.* [1853] Mer. S. T. 2 (1854) 23-.
- — —. *Flesch, M. H. J.* Würzb. Ps. Md. Sb. (1882) 37-.
- — — and daylight. *Nelson, E. M.* Mer. S. J. 4 (1884) 621-.
- — —, with low powers. *Karop, G. C.* [1896] Quek. Mer. Cl. J. 6 (1897) 278-.
- "canalisation" of electric light. *Tchikoleff, W.* Lum. Élect. 3 (*1881) 132-, 151-, 184-.
- centering the illuminating beam. *Queen, J. W.* Mer. S. J. 5 (1885) 524-.
- central versus oblique light. *Nelson, E. M.* Mer. S. J. 6 (1886) 322-.
- colour-. *Edwards, A. M.* Am. Mer. J. 16 (1895) 183-.
- *Rheinberg, J.* [1896-1900] Quek. Mer. Cl. J. 6 (1897) 346-, 438; Mer. S. J. (1899) 142-; Am. Mer. J. 21 (1900) 1-.
- , for stained preparations. *Flesch, M. Z.* Ws. Mkr. 3 (1886) 52-.
- dark-field. *Gebhardt, W.* Z. Ws. Mkr. 15 (1898) 289-.
- by direct light. *Holmes, O. W.* Am. Ac. P. 2 (1848-52) 326-.
- — —. *Selle, —.* Fsehr. Md. 8 (1890) 775-, 814-.
- direction, measurement. *Stuart, A.* [1870] St. Pét. Ac. Sc. Bll. 15 (1871) 517-.
- by electric light. *Flesch, M. Z.* Ws. Mkr. 1 (1884) 175-.
- under high powers. *Smith, Jas.* Mer. S. J. 3 (1890) 398-.
- improvement. *Grubb, T.* Ir. Ac. P. 5 (1853) 296-.
- by incandescent gas. *Arsonval, A. d'.* Par. S. Bl. Mm. 40 (1888) (C. R.) 170-.
- lime light, portable form. *McIntosh, L. D.* Am. S. Mer. P. 13 (1891) 41-.
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—, early form. *Mayall, J. (jun.)* Mer. S. J. (1890) 420-.

—, fluorite in. *Nelson, E. M.* [1892] Quek. Mer. Cl. J. 5 (1894) 122.

—, without fluorite. *Jourdain, P. E. B.* Mer. S. J. (1898) 395-.

—, new. *Cox, J. D.* [1890] Mer. S. J. (1891) 248-.

—, *Reichert's.* *Heurck, H. van.* Brux. S. Blg. Mer. Bl. 14 (1888) 156-.

—, *Zeiss's.* *Ewell, M. D.* Mer. S. J. (1887) 462.

—, —, *Heurck, H. van.* Brux. S. Blg. Mer. A. 13 (1890) 123-.

—, — $\frac{1}{2}$ in., and method of detecting spurious diffraction images. *Nelson, E. M.* [1889] Quek. Mer. Cl. J. 4 (1892) 55-.

apparatus for quickly changing. *Schoch, G.* Zür. Vjschr. 13 (1868) 395-.

—, — —, *Zeiss's.* *Czapski, S.* Z. Ws. Mkr. 4 (1887) 293-.

—, — —, —, *Anon.* Mer. S. J. (1887) 646-.

attachment, *Bulloch's.* *Anon.* Mer. S. J. 4 (1884) 118-.

back of, and condenser. *Nelson, E. M.* [1888] Mer. S. J. (1889) 288-.

care and use. *Wales, W.* Mer. S. J. 5 (1885) 708-.

centering. *Brewster, (Sir) D.* B. A. Rp. (1857) (pt. 2) 4-.

—, *Leroy, C. J. A.* C. R. 113 (1891) 639-.

collar-adjustment as affected by change of eye-pieces. *Stokes, A. C.* [1894] Mer. S. J. (1896) 127.

comparative studies. *Strehl, K.* Z. Ws. Mkr. 17 (1900) 425-.

construction. *Wenham, F. H.* M. Mer. J. 1 (1869) 111-, 170-, 225-, 295-, 343-; 2 (1869) 93-.

correction. *Wenham, F. H.* Quek. Mer. Cl. J. 2 (1871) 21-.

—, primitive form. *Anon.* Mer. S. J. (1899) 436-.

cover-carrier for. *Wales, W.* [1886] Mer. S. J. (1887) 296.

fluorspar lenses. *Spencer, H. R.* Am. S. Mer. P. 12 (1890) 248-.

focal length. *Cross, C. R.* Franklin I. J. 59 (1870) 401-.

- focal length of 3.9 mm. *Kerber, A.* *Cztg. Opt.* 11 (1890) 73-, 86-.
- , accurate photographic method of determining. *Legros, V.* *C. R.* 130 (1900) 270-.
- , determination. *Francotte, P.* *Brux. S. Blg. Mer. Bl.* 21 (1894) 208-.
- , —. *Franklin, W. S.* *Ps. Rv.* 1 (1894) 142-.
- , —, and magnifying power. *Royston-Pigott, G. W.* *Quek. Mer. Cl. J.* 3 (1873) 34-.
- , —, —, —, optical rule for. *Nelson, E. M.* [1895] *Quek. Mer. Cl. J.* 6 (1897) 208-.
- , differences between nominal and solar. *Royston-Pigott, G. W.* *QJ. Mer. Sc.* 12 (1872) 268-.
- and optical centre, determination. *Durand, W. F.* *Am. Mer. J.* 6 (1885) 141-.
- foci, and screen distances, determination. *Nelson, E. M.* *Quek. Mer. Cl. J.* 5 (1894) 456-.
- formula, new. *Wenham, F. H.* [1872] *R. S. P.* 21 (1873) 111-.
- Hartnack's new. *Vogel, H. W.* *Mer. S. J.* (1888) 646.
- high power. *Beale, L. S.* *R. S. P.* 14 (1865) 35-.
- , —. *Arachnoidiscus* as test. *Smith, T. F.* [1888] *Quek. Mer. Cl. J.* 3 (1889) 247-.

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- Royston-Pigott, G. W.* *M. Mer. J.* 5 (1871) 65-; *QJ. Mer. Sc.* 12 (1873) 111-.
- Dippel, L.* *Z. Ws. Mkr.* 1 (1884) 485-.
- Gundlach, E.* *Am. S. Mer. P.* (1885) 51-.
- advantages; and use of deviation-tables. *Royston-Pigott, G. W.* *M. Mer. J.* 4 (1870) 20-, 134-.
- fluids for. *Stokes, A. C.* [1891] *Mer. S. J.* (1892) 261-.
- , refractive index. *Martinotti, G. Z.* *Ws. Mkr.* 3 (1886) 320-.
- homogeneous. *Stephenson, J. W.* *Mer. S. J.* 2 (1879) 266-.
- , correction. *Dippel, L.* (xii) *Z. Instk.* 2 (1882) 269-; *Z. Ws. Mkr.* 1 (1884) 29-.
- , and fluids of same refractive index. *Heurck, H. van.* [1891] *Brux. S. Blg. Mer. Bl.* 8 (*1883) xxii-.
- , Hartnack's. *Anon.* *Mer. S. J.* (1898) 351.
- , origin. *Abbe, E.* *Mer. S. J.* 1 (1881) 131-.
- , question of adjustability. *Blackham, G. E.* (xii) *Am. S. Mer. P.* (1881) 61-.
- , semi-apochromatic, Koristka's. *Amann, J.* *Z. Ws. Mkr.* 11 (1894) 145-.
- , Stephenson's. *Abbe, E.* *Jena. Sb.* (1879) 3-.
- large aperture. *Woodward, J. J.* *M. Mer. J.* 10 (1873) 210-.
- , —. *Keith, R.* *M. Mer. J.* 12 (1874) 124-.
- , —. *Stephenson, J. W.* *Mer. S. J.* 1 (1878) 51-.
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- , —, —. *Dallinger, W. H.* *Mer. S. J.* (1894) 413-.
- oil. *Heurck, H. van.* *Brux. S. Blg. Mer. Bl.* 4 (*1878) cxov-.
- , of Zeiss, compared with Spencer's objectives. *Smith, H. L.* [1878] (xii) *Am. Mer. J.* 1 [(1878-79)] 28-.
- and test-objects. *Mayall, J.* [1868] *M. Mer. J.* 1 (1869) 90-.
- theory. *Brakey, (Rev.) S. L.* *M. Mer. J.* 11 (1874) 221-, 249-.
- Tolles's $\frac{1}{8}$. *Bicknell, E.* *M. Mer. J.* 7 (1872) 70-.
- $\frac{1}{8}$ and Powell and Lealand's $\frac{1}{8}$. *Bicknell, E.* *M. Mer. J.* 8 (1872) 13-.
- , resolution of *Amphipleura pellucida*. *Woodward, J. J.* *M. Mer. J.* 6 (1871) 150-; 7 (1872) 165-.
- , —, —, — (Woodward). *Bicknell, E.* *M. Mer. J.* 6 (1871) 225-.
- imperfections and tests. *Royston-Pigott, G. W.* *QJ. Mer. Sc.* 10 (1870) 10-.
- improvements. *Spencer, C. A.* *Silliman J.* 13 (1852) 290-.
- , *Gundlach, E.* *Am. S. Mer. P.* (1884) 148-.
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- (of 1 in.). *M., W.* *Am. Mer. J.* 6 (1885) 203-.
- , —. *Tolman, H. L.* *Am. Mer. J.* 13 (1892) 93-.
- , measurement. *Marshall, W. P.* *Midl. Ntlst.* 10 (1887) 226-.
- , —. *Nelson, E. M.* *M. Mer. S. J.* (1887) 1032-.
- , standard of comparison. *Ingpen, J. E.* [1872] *M. Mer. J.* 8 (1872) 253-; *Quek. Mer. Cl. J.* 3 (1873) 97-.
- method of marking. *Krauss, W. C.* *Am. Mer. S. T.* 17 (1895) 359-.
- microspectral, with normal spectrum. *Engelmann, T. W.* *Arch. An. Pl. (Pl. Ab.)* (1900) (Suppl.) 338.
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- nomenclature. *Ward, R. H.* *M. Mer. J.* 8 (1872) 15-.
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- and their power. *Bicknell, E.* *M. Mer. J.* 7 (1872) 68-.
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 —. *Royston-Pigott, G. W. M.* Mer. J. 13 (1875) 147-; Mer. S. J. 3 (1880) 916-.
 —. *Nelson, E. M.* Mer. S. J. (1888) 816-.
 —. *Mayall, J. (jun.)* Mer. S. J. (1890) 542-.
 —. *Nelson, E. M.* Mer. S. J. (1896) 681.
 —. Abbe's method. *Fripp, H. E.* [1877] (xii) Bristol Nt. S. P. 2 (1879) 3-.
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 —. *Keith, R.* Mer. S. J. 1 (1878) 142-; 2 (1879) 269.
 —. $\frac{1}{2}$. *Cutter, E.* Am. Mer. J. 16 (1895) 225-.
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 — — —. Wenham's method, and Marshall's zoophyte trough. *Ingen, J. E.* [1892] Quek. Mer. Cl. J. 5 (1894) 223-.
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 Salterystals, preservation as permanent objects. *Warrington, R.* [1844] C. S. Mm. 2 (1843-45) 71-.
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 Silicon fluoride (? silica), crystals. *Anon.* Mer. S. J. (1887) 677-.
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- accessory. *Anon.* Mer. S. J. 5 (1885) 1058-.
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 differential. *Hildebrand, H. E.* Z. Ws. Mkr. 11 (1894) 304-.
 — warm. *Bird, C. H. G.* QJ. Mer. Sc. 15 (1875) 372-.
 electrically heated. *Curties, C. L.* Mer. S. J. (1899) 354-.
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 goniometer-, Hartnack's. *Anon.* Mer. S. J. 4 (1884) 960-.
 —, Swift's. *Anon.* Mer. S. J. 4 (1884) 960.
 hand. *Hildebrand, H. E.* Z. Ws. Mkr. (1886) 386-.
 hot. *Macfadyen, A.* [1899] Mer. S. J. (1900) 110-.
 — or cold. *Symons, W. H.* [1881] Mer. S. J. 2 (1882) 21-.
 improved, Bausch and Lomb's. *Anon.* Mer. S. J. (1899) 79-.
 indicator-. *Johnson, A. S.* Silliman J. 21 (1856) 386-.
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- Cramer, C.* Z. Ws. Mkr. 3 (1886) 5-.
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Dallinger, —. Mer. S. J. (1894) 537-.
Nelson, E. M. Mer. S. J. (1897) 185-.
 Baker's attachable. *Anon.* Mer. S. J. (1900) 512.
 Bausch and Lomb's. *Anon.* Mer. S. J. (1887) 650-.
 — — — attachable. *Anon.* Mer. S. J. (1899) 334-.
 Brunée's. *Brauns, R.* Z. Ws. Mkr. 14 (1897) 11-.
 cam, Swift's. *Anon.* Mer. S. J. 6 (1886) 1052-.
 Klönne and Müller's. *Behrens, W.* Z. Ws. Mkr. 2 (1885) 502-.
 Mayall's. *Anon.* Mer. S. J. 5 (1885) 122.
 Nachet's. *Anon.* Mer. S. J. (1893) 97-.
 Reichert's. *Fleischl, E. von.* Z. Ws. Mkr. 2 (1885) 289-; 4 (1887) 25-.
 —. *Zimmermann, A.* Z. Ws. Mkr. 12 (1895) 433-.
 removable. *Curties, C. L.* Mer. S. J. (1898) 253.
 with vertical pinions. *Bulloch, W. H.* Mer. S. J. (1890) 795-.
 Winkel's. *Behrens, W.* Z. Ws. Mkr. 9 (1892) 483-.

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- Winkel's, for circular stages. *Behrens, W.* Z. Ws. Mkr. 10 (1893) 297-.
- for Zeiss stands. *Czapski, S.* Z. Ws. Mkr. 11 (1894) 301-.
- Zeiss's. *Measures*, —. *Mer. S. J.* (1894) 768.
- , *Anon.* *Mer. S. J.* (1895) 97-.
- polarising. *Smith, James. J.* *Mer. Sc.* 8 (1860) 203-.
- revolving. *Taylor, T.* *Am. S. Mer. P.* 13 (1891) 189-.
- , mirror, etc., combined. *Éternod, A.* Z. Ws. Mkr. 4 (1887) 41-.
- secondary. *Hislop, W.* *Mer. S. T.* 6 (1858) 94-.
- selenite analysing. *Hislop, W.* *Quek. Mer. Cl. J.* 1 (1868-69) 225-.
- stage-plate, glass, with rectangular movements. *Cunningham, K. M.* *Am. Mer. J.* 19 (1898) 33-, 230.
- , Millar's multiple. *Anon.* *Mer. S. J.* 4 (1884) 120.
- , Stewart's safety-. *Anon.* *Mer. S. J.* 4 (1884) 120-.
- substage. *Nelson, E. M.* [1890] *Mer. S. J.* (1891) 257.
- , Bausch and Lomb's complete. *Anon.* *Mer. S. J.* (1899) 219-.
- , — — duplex. *Bausch, E.* [1900] *Mer. S. J.* (1901) 83-.
- fittings, standard sizes. *Nelson, E. M.* [1899] *Mer. S. J.* (1900) 141.
- , necessity. *Mayall, J. (jun.)* *Mer. S. J.* (1888) 1024-.
- table-. *Anon.* *Mer. S. J.* (1899) 355.
- warm. *Bartley, E. H.* (xii) *Am. Mer. J.* 1 (1880) 181-.
- , *Malassez, L.* *Par. Lb. Hl. Tr.* (1886-87) 21-.
- and cold. *Dewitz, H.* *Arch. Mkr. An.* 30 (1887) 666-.
- — —. *Anon.* *Mer. S. J.* (1887) 299-.

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- Burrill, T. J.* *Am. S. Mer. P.* 11 (1889) 53-.
- Coutant, R. B.* *Mer. S. J.* (1894) 736-.
- Bausch, E.* [1898] *Mer. S. J.* (1899) 81-.
- with concentric movements. *Cox, J. D.* (xii) *Am. S. Mer. P.* (1883) 147-.
- continental form, development. *Dallinger, —.* *Mer. S. J.* (1893) 573-.
- — —, *Nias, J. B.* *Mer. S. J.* (1893) 596-.
- dissecting, and lens-carrier. *Siddons, (Lt.-Col.) H. G. F.* *Mer. S. J.* (1896) 679-.
- , Meyer's improved. *Anon.* *Mer. S. J.* (1899) 218-.
- graphological, small. *Ewell, M. D.* *Am. S. Mer. P.* 13 (1891) 69-.
- Günther's, Benda, C.* [1899] *Arch. An. Pl. (Pl. Ab.)* (1900) 179-.
- Leitz's, Nelson, E. M.* [1893] *Quek. Mer. Cl. J.* 5 (1894) 309-.
- and optical apparatus. ?*Marpmann, G. Z.* *Angew. Mkr.* 2 (1897) 290-, 321-, 351-.

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- Reichert's model large No. Ia. *Dippel, L.* Z. Ws. Mkr. 5 (1888) 145-.
- , with new stage and iris-diaphragm. *Anon.* *Mer. S. J.* 6 (1886) 307-.
- non-inclinable. *Anon.* *Mer. S. J.* (1899) 217, 647-.
- U-shaped. *Beall, W. J.* [1899] *Mer. S. J.* (1900) 114-.
- and tubes, etc. *Hildebrand, H. E.* Z. Ws. Mkr. 12 (1895) 145-.
- Zeiss's. *Czapski, S.* Z. Ws. Mkr. 4 (1887) 289-.
- , *Anon.* *Mer. S. J.* (1895) 225-.
- Zeiss-Babuchin. *Czapski, S.* Z. Ws. Mkr. 4 (1887) 290-.
- Zentmayer's American - Continental. *Anon.* *Am. Mer. S. P.* 14 (1892) 48-.

- Tercentenary of microscope. *Mancini, E.* *N. Antol. Sc.* 114 (1890) 506-.
- — —. *Rutherford, W.* [1890] *Sc. Mer. S. P. & T.* 1 (1895) iv-.

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- Pohl, J. J.* *Wien SB.* 11 (1853) 504-.
- Amici's test. *Karop, G. C.* [1895] *Quek. Mer. Cl. J.* 6 (1897) 79-.
- Colour test. *Royston-Pigott, G. W.* *M. Mer. J.* 10 (1873) 61-.
- Efficiency and testing. *Reinicke, F. Al. D.* *Nt. Ztg.* 3 (1857) 416-.
- — —. *Nobert, F. A. N.-Vorp. Mt.* 13 (1882) 92-.

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- Pohl, J. J.* *Wien SB.* 40 (1860) 63-.
- Stodder, C.* [1867] *Am. Nt.* 2 (1869) 93-.
- (Stodder.) *Sullivan, W. S.* *Am. J. Sc.* 46 (1868) 347-.
- Woodward, J. J.* *M. Mer. J.* 6 (1871) 26-.
- Webb, W.* *Quek. Mer. Cl. J.* 3 (1873) 155, 198.
- Woodward, J. J.* *Quek. Mer. Cl. J.* 3 (1873) 198-.
- 19th band. *Woodward, J. J.* *QJ. Mer. Sc.* 8 (1868) 225-.
- — —. *Barnard, F. A. P. M. Mer. J.* 6 (1871) 194-.
- (Barnard.) *Woodward, J. J.* *M. Mer. J.* 7 (1872) 10-.
- — —. *Barnard, F. A. P. M. Mer. J.* 7 (1872) 119-.
- — —, and its observers. *Stodder, C. M. Mer. J.* 5 (1871) 118-; 6 (1871) 201-.
- — —, resolution. *Stodder, C. M. Mer. J.* 3 (1870) 257-.
- — —. *Woodward, J. J.* *M. Mer. J.* 8 (1872) 227-.
- definition. *Woodward, J. J.* *M. Mer. J.* 4 (1870) 113-.
- and diatoms in measuring power. *Castracane degli Antelminelli, F.* *Rm. At.* 22 (1869) 111-, 170-.
- — — — —. *Royston-Pigott, G. W. M.* *Mer. J.* 3 (1870) 305-.

and Möller's diatom type slide and modern microscopes. *Abbott, F.* *Tasm. R. S. M. Not.* (1869) 35-.

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Brooke, C. [1854] *R. S. P.* 7 (1854-55) 139-.

Bailey, J. W. *Silliman J.* 19 (1855) 28-.

Woodward, J. J. *Brux. S. Blg. Mor. Bl.* 3 (*1877) cciii-.

Nelson, E. M. [1883] *Mer. S. J.* 4 (*1884) 139-.

Amphipleura pellucida. *Woodward, J. J.* *Am. Nt.* 6 (1872) 193-.

—, *Marpmann, G.* *Z. Angew. Mkr.* 3 (1898) 175-.

—, resolution. *Woodward, J. J.* *M. Mer. J.* 6 (1871) 150-; 7 (1872) 165-.

—, —, *Gifford, J. W.* *Mer. S. J.* (1892) 173-.

—, —, by central light. *Detmers, H. J.* [1883] *Mer. S. J.* 4 (*1884) 143.

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—, —, —, *Deck, L.* *Am. S. Mer. P.* 12 (1890) 170-.

—, —, and a violet copper-iodine light filter. *Zettnow, —.* [1893] *Quek. Mer. Cl. J.* 5 (1894) 286-.

—, and *Surirella gemma.* *Woodward, J. J.* *Am. J. Sc.* 1 (1871) 345-.

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—, etc., structure. *Wenham, F. H.* *M. Mer. J.* 2 (1869) 25-, 158-.

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—, (Bailey). *De La Rue, W.* [1849] *Silliman J.* 9 (1850) 23-.

—, (De la Rue); and 2 new test objects. *Bailey, J. W.* *Silliman J.* 11 (1851) 82-.

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—, and Lendl's microscope. *Apáthy, S.* *Z. Ws. Mkr.* 8 (1891) 433-.

—, ultimate structure of valve. *Smith, T. F.* [1893] *Mer. S. J.* (1894) 141-.

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—, structure. *Reade, J. B.* *M. Mer. J.* 2 (1869) 79-.

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—, —, —, *Morley, E. W.* *M. Mer. J.* 15 (1876) 223-.

—, plates (Fasoldt's). *Ward, R. H.* *Am. S. Mer. P.* (1887) 318-.

—, (—). *Dudley, R. H.* *Mer. S. J.* (1888) 299-.

—, (Ward). *Fasoldt, C.* *Mer. S. J.* (1888) 817.

—, slides. *Heurck, H. van.* *Z. Angew. Mkr.* 4 (1899) 1-.

Theory. *Abbe, (Dr.) E.* *Arch. Mkr. An.* 9 (1873) 413-.

—, *Strehl, K.* [1898-1900] *Z. Instk.* 18 (1898) 301-, 356; 19 (1899) 325-; *Erlang. Ps. Md. S. Sb.* 32 (1901) 1-.

—, and practice. *Davis, G. E.* *Manch. Mer. S. Rp.* (*1883-84) 60-.

—, —, *Hitchcock, R.* *Am. As. P.* (1884) 566-.

—, —, *Gilly, H.* *Nim. S. Sc. Bl.* (1895) xxxii-.

—, —, *Marsson, T.* *Z. Angew. Mkr.* 1 (1896) 33-, 65-.

—, progress. *Poli, A.* *Rv. Sc.-Ind.* 19 (1887) 89-, 109-, 137-.

—, simplified. *Pelletan, J.* *J. Mergr.* 10 (1886) 279-.

Tremor, prevention. *Ross, A.* *Mer. J.* 1 (1841) 23-.

Tube length, optical. *Crisp, F.* *Mer. S. J.* 3 (1883) 816-.

—, —, determination. *Ashe, A.* [1892-93] *Quek. Mer. Cl. J.* 5 (1894) 152-, 289-.

—, and resolving power. *Jameson, H. G.* *Mer. S. J.* (1892) 272-.

—, standard. *Gage, S. H., Mercer, A. C., & Barr, C. E.* *Am. S. Mer. P.* 12 (1890) 250-.

—, —, *Beck, C.* *Mer. S. J.* (1893) 614.

Upper work, new. *Berger, M.* *Z. Instk.* 18 (1898) 129-.

Use. *Audouin, J. V.* *A. Sc. Nt.* 3 (1824) 354-.

—, in agriculture. *Cobb, N. A.* *Mer. S. J.* (1897) 433-.

—, for drawing. *Alton, E. d'.* *D. Nf. B.* (1847) 176-.

—, of high powers. *Peragallo, H.* *A. Mergr.* 4 (1891-92) 585-.

—, in horizontal position. *Slack, H. J.* *Mer. S. J.* 4 (1884) 455.

—, of low powers, with deep eyepieces. *Slack, H. J.* *Intell. Obs.* 4 (1863) 169.

—, for photography. *Neyreneuf, V.* *C. R.* 84 (1877) 344-; *Caen S. L. Bl.* 1 (1877) 131-; *J. de Ps.* 6 (1877) 124-.

—, physical and chemical investigations. *Lehmann, O.* *Z. Instk.* 6 (1886) 325-.

—, practical. *Hepworth, J. J.* *Mer. Sc.* 4 (1856) 109-; 5 (1857) 1-.

—, in workshop. *Rogers, W. A.* *Mer. S. J.* 6 (1886) 679-.

3084 Eye-pieces. (See also Astronomy, 2120.)

- achromatic. *Brewster, (Sir) D.* Nicholson J. 14 (1806) 388-.
- , *Ellis, R. L.* Camb. Mth. J. 1 (1839) 269-.
- , 2-lens (of Galileo). *Forti, A.* (vi *Adds.*) Firenze At. Ac. Georg. 1 (1854) 483-.
- , 4-lens. *Sang, E.* Edinb. R. S. P. 14 (1888) 153-.
- , single. *Reade, J. B.* R. S. P. 4 (1840) 195.
- , for telescopes. *Gilbert, L. W.* Gilbert A. 34 (1810) 292-.
- astigmatic. *Gundlach, E.* Mer. S. J. 6 (1886) 313, 509-.
- , *Stockwell, J. K.* Mer. S. J. 6 (1886) 313-.
- binocular. *Tolles, R. B.* Am. J. Sc. 39 (1865) 212-.
- , for high powers. *Smith, H. L.* Am. J. Sc. 45 (1868) 42-.
- , stereoscopic, Tolles's. *Smith, H. L.* M. Mer. J. 6 (1871) 45-.
- cross wires. *Schröder, H.* Cztg. Opt. 18 (1897) 4-, 14-.
- , quartz fibres for. *Bleekrode, L.* Nt. 50 (1894) 174.
- , —, —, *Wadsworth, F. L. O.* [1897] Mer. S. J. (1898) 232-.
- , in telescope. *Stevens, J. S.* Nt. 59 (1898-99) 255-.
- , —, history. *Hammer, E.* Cztg. Opt. 17 (1896) 221-.
- , —, problem. *Littrow, J. J. von.* Oken Isis (1831) 1067-.
- , —, —, *Littrow's.* *Muncke, G. W.* Baumgartner Z. 2 (1833) 53-; 3 (1835) 49-.
- , —, self-luminous. *Bohn, K.* (xii) Z. Instk. 2 (1882) 12-.
- diagonal. *Forbes, G. B. A. Rp.* (1878) 449.
- drawing, Leitz's. *Schiemenz, P.* Z. Ws. Mkr. 12 (1895) 289-.
- Ehrlich's. *Anon.* Mer. S. J. (1900) 250.
- erecting, new. *Jadanza, N.* Tor. Ac. Sc. At. 22 (1886-87) 447-.
- fluorescent, modified form of Soret's. *Dewar, J., & Living, G. D.* Camb. Ph. S. P. 4 (1883) 342-.
- , new. *Martens, F. F.* Z. Instk. 18 (1898) 252-.
- focal length, apparatus to determine. *Brauer, G.* (xii) Rs. C. Ps. S. J. 7 (Ps.) (1875) [Pt. 1] 55-.
- "holoscopic," Watson and Son's. *Anon.* Mer. S. J. (1899) 651.
- Huygens's. *Listing, J. B.* Gött. Nr. (1871) 89-.
- , *Hunter, J.* [1896] So. Mer. S. P. & T. 2 (1900) 61-.
- , achromatism. *Höegh, E. von.* Cztg. Opt. 7 (1886) 37-, 84.
- , and applications. *Schröder, H.* Cztg. Opt. 19 (1898) 91-, 101-, 113.
- , Ramsden's, achromatism. *Mittenzwey, M.* Cztg. Opt. 7 (1886) 61.

- interchangeable diaphragms. *Malassez, L.* Arch. An. Mer. 3 (1900) 436-.
- magnifying power. *Abbe, —.* Mer. S. J. 4 (1884) 804.
- micrometer-. *Soleil, H. A. C.* 18 (1869) 385-.
- , *Djakonov, D.* Rs. Ps.-C. S. J. 18 (Ps.) (1886) 120-; J. de Ps. 7 (1888) 220.
- , *Krysiński, S.* Virch. Arch. 111 (1888) 378-.
- , *Ward, R. H.* J. Mergr. 13 (1889) 209-.
- , *Hartwich, C.* Z. Ws. Mkr. 17 (1900) 156-.
- , compensation-. *Zeiss, —.* Mer. S. J. (1888) 797-.
- , filar. *Rogers, W. A.* Am. Mer. S. P. 14 (1892) 132.
- , for fixed stages. *Hartwich, C.* Z. Ws. Mkr. 17 (1900) 432-.
- , —, microscopes. *Fischer, A.* Moso. S. Nt. Bll. 3 (1837) 21-.
- , —, *Coulier, —.* Brown-Séguard J. Pl. 2 (1859) 670-.
- , —, *Ewell, M. D.* Mer. S. J. 6 (1886) 316.
- , —, *Jones, E. J.* Am. Mer. J. 11 (1890) 3-.
- , made by photography. *Levison, W. G.* N. Y. Ac. A. 11 (1898) 405-.
- , standard. *Findley, G. M.* Mer. J. 8 (1872) 264-.
- , *Winkel's.* *Behrens, W.* Z. Ws. Mkr. 2 (1885) 41-.
- , *Zeiss's.* *Anon.* Mer. S. J. 4 (1884) 118.
- for microphotography. *Neuhauss, R.* Z. Ws. Mkr. 5 (1888) 328-.
- , microscope. *Goodwin, W.* [1889-90] Quek. Mer. Cl. J. 4 (1892) 71-; Mer. S. J. (1890) 417.
- , *Azoulay, —, & Nageotte, —.* Par. S. Bl. Mm. 49 (1897) (C. R.) 641-.
- , with normal reflection. *Cornu, A.* As. Fr. C. R. (1893) (Pt. 1) 205.
- , —, widened field of vision and iris diaphragm. *Czapski, S.* Z. Ws. Mkr. 12 (1895) 437-.
- with moveable indicator, Kuznitsky's. *Wilde-
man, É. de.* Brux. S. Blg. Mer. Bll. 22 (1897) 12-.
- multiple, Griffith's. *Anon.* Mer. S. J. 4 (1884) 443-.
- nadiral, interference fringes in. *Hurion, A.* J. de Ps. 1 (1892) 414-.
- new. *Krüß, A. H.* A. Ps. C. 153 (1874) 601-.
- , *Nelson, E. M.* [1887] Quek. Mer. Cl. J. 3 (1889) 173-; Mer. S. J. (1887) 928.
- , solid. *Reade, J. B.* B. A. Rp. (1850) (pt. 2) 15-.
- nomenclature. *Ward, R. H.* M. Mer. J. 8 (1872) 15-.
- , and sizes. *Ward, R. H., & others.* Am. S. Mer. P. (1884) 228-.
- orthoscopic. *Rabenhorst, L.* Bt. Ztg. 8 (1850) 526-; 9 (1851) 529-.
- polarising. *Cavalleri, G. M.* Mil. At. I. Lomb. 1 (1858) 283-; Mil. I. Lomb. Rd. 6 (1873) 477-.

polarising, Abbe's. *Anon.* *Mer. S. J.* 4 (1884) 462.
 —, Cavalleri's. *Cecchi, (padre) F.* (xii) *Rv. Sc.-Ind.* 5 (1873) 133-.
 —, course of light in. *Sang, E.* *Edinb. R. S. P.* 18 (1892) 323-.
 —, —, —, —, *Tait, —.* *Edinb. R. S. P.* 18 (1892) 337-.
 —, improved, and new projection eye-piece. *Stringer, E. B.* *Mer. S. J.* (1900) 537-.
 with reflecting and polarising attachments. *Fuchs, F.* (xii) *Z. Instk.* 2 (1882) 305-.
 revolving, Leitz's. *Anon.* *Mer. S. J.* (1900) 249-.
 simple lenses as. *Breton [de Champ], Paul.* *C. R.* 50 (1860) 422-.
 starlit transit. *Royston-Pigott, G. W.* *As. S. M. Not.* 36 (1876) 250-.
 stereoscopic. *Abbe, E.* *Carl Rpm.* 17 (1881) 197-.
 and substage fittings, standard sizes. *Nelson, E. M.* [1899] *Mer. S. J.* (1900) 141.
 telescopic, measuring the power of. *Adamson, D. B.* [1887] *S. Aust. R. S. T.* 11 (1889) 112-.
 —, variable magnification. *Goring, C. R.* *Edinb. N. Ph. J.* 25 (1838) 259-.
 terrestrial, formulæ. *Gonnella, T. N.* *Cim.* 18 (1863) 306-.
 theory. *Moutier, J.* *Par. S. Phlm. Bll.* 1 (1877) 172-.

3085 Photographic Lenses and Systems.

Camera. *Voigtländer, P. W. F.* [1841] *Dingler* 83 (1842) 187-.
 — (Voigtländer's). *Reindl, J.* *Dingler* 86 (1842) 128-.
 —, *Pretsch, P.* [1858] *Pht. S. J.* 5 (1859) 39-, 61-.
 —, "autograph," Walmsley's. *Fox, C. E.* *Mer. S. J.* (1896) 354.
 —, binocular. *Brewster, (Sir) D. B. A. Rp.* (1849) (pt. 2) 5; *Edinb. T. Sc. S. Arts* 3 (1851) 259-.
 —, improvements. *Brewster, (Sir) D. B. A. Rp.* (1849) (pt. 2) 5.
 —, suggested by Brewster. *Emerson, E. Silliman J.* 32 (1861) 227-.
 —, lucida applied to photography. *Carlini, F.* *Presse Sc.* 1 (1863) 350-.
 —, photoelectric, Jaspas's. *Crahay, J. G.* (vi *Adds.*) *Rm. Cor. Sc.* 3 (1855) 53-.
 —, relief of image on ground glass of. *Claudet, A.* *R. S. P.* 8 (1856-57) 569-.
 —, solar, for enlarging. *Claudet, A. B. A. Rp.* (1860) (pt. 2) 62-.
 —, for travelling. *Hannot, A.* *Brux. Bll. Pht.* 20 (1881) 25-.
 —, vertical, invention. *Goode, G. B.* *Science* 3 (1884) 672-.
 —, —, —, *Gage, S. H.* *Science* 4 (1884) 5.
 —, X-ray photography by. *Nipher, F. E.* *Science* 3 (1896) 783.

Concave mirror, use for photography. *Smith, F. J.* [1892] *Nt.* 47 (1892-93) 10.
 Definition, photographic. *Mallock, A.* *Nt.* 44 (1891) 552-.
 Enlargement. *Wallon, É.* *A. Cons. Arts et Mét.* 1 (1899) 422-.
 —, apparatus. *Monkhoven, (Dr.) — van.* *Les Mondes* 5 (1864) 125-.
 Exposers, determination of speed. *Pickering, W. H.* *Science* 4 (1884) 454; *Am. Ac. P.* 20 (1885) 478-.
 —, principles of construction. *Pickering, W. H.* *Am. Ac. P.* 20 (1885) 483-.
 Focus of chemical, luminous and calorific rays, difference. *Borlinetto, L., & Zantedeschi, —.* *Wien SB.* 21 (1856) 521-.
 —, equaliser, self-acting. *Claudet, A. F. J.* *R. S. P.* 15 (1867) 456-.
 —, photogenic, for daguerreotype. *Cavalleri, G. M.* (vii) *Bb. It.* 13 (1846) 229-.
 Focusing. *Pickering, W. H.* *Science* 1 (*1883) 160-.
 Image, curvature due to primary and secondary foci of oblique pencils of light. *Bow, R. H.* [1863] (vi *Adds.*) *Pht. S. J.* 8 (1864) 304-, 312-.
 —, formation by objectives, conditions. *Rohr, M. von.* *Z. Instk.* 17 (1897) 271-; 18 (1898) 4-.
 —, illumination in landscape photography, method of equalising. *Slight, G. H.* [1867] *Edinb. Sc. S. Arts T.* 7 (1868) 313-.
 Images, form, with large and small lenses. *Brewster, (Sir) D. B. A. Rp.* (1852) (pt. 2) 3-.
 —, properties. *Vogel, H.* *A. Ps. C.* 140 (1870) 451-.
 —, reflected, in optical combinations. *Dallmeyer, T. R.* *Phot. J.* 14 (1890) 155-.
 Instantaneous perigraph. *Mangin, (col.) A.* *As. Fr. C. R.* (1878) 339-.
 Intensification of photographic pictures, optical device for. *Rayleigh, (Lord).* *Ph. Mg.* 44 (1897) 282-.
 Oblique pencils. *Goddard, J. T.* *Pht. S. J.* 7 (1862) 349-; 8 (1864) 12-, 50-, 209-, 302, 310-, 420-.
 Opera glasses, photographic. *Ferrand, H.* [1897] *Isère S. Bll.* 30 (1899) 129-.
 Optics, photographic. *Brewster, (Sir) D.* [1857] *Pht. S. J.* 4 (1858) 83-.
 —, —, *Petzval, J.* *Wien SB.* 24 (1857) 50-, 92-, 129-; 26 (1857) 33-.
 —, — (Petzval). *Pretsch, P.* [1857] *Pht. S. J.* 4 (1858) 102-.
 —, —, *Symonds, P.* *Pht. Arch.* 1 (1860) 198-, 216-, 238-.
 —, —, *Claudet, A. F. J.* *Ph. Mg.* 32 (1866) 212-.
 —, —, *Hannot, A.* *Brux. Bll. Pht.* 19 (1880) 46-, 120-, 129-.
 —, —, *Caplatzi, A.* *Mer. S. J.* (1891) 818-.
 —, —, *Lummer, O.* *Z. Instk.* 17 (1897) 208-, 225-, 264-.
 —, —, *Miethe, A. D. Nf. Vh.* (1897) (*Th.* 2, *Hälfte* 1) 132-.
 —, —, *Schiffner, F.* *Wien Pht. Cor.* 37 (1900) 550-.
 Perspective photograph, visual point. *Streintz, H.* *Wien Pht. Cor.* 29 (1892) 559-.

- Perspective, photographic. *Streintz, H.* Wien Pht. Cor. 29 (1892) 477-, 548-.
- , —. *Miethe, A.* Wien Pht. Cor. 31 (1894) 159-.
- , —, apparently incorrect. *Rothwell, J.* [1860] Pht. S. J. 7 (1862) 24-.
- Photogrammetry. *Hübl, A. (Frhr.) von.* Wien Pht. Cor. 29 (1892) 269-.
- Photogrammetric instruments, new. *Doležal, E.* Wien Pht. Cor. 37 (1900) 81-.
- methods (with ordinary apparatus). *Schiffner, F.* Wien Pht. Cor. 26 (1889) 262-.
- reconstructions. *Doležal, E.* Wien Pht. Cor. 35 (1898) 345-, 408-.
- studies. *Schiffner, F.* Wien Pht. Cor. 27 (1890) 314-; 28 (1891) 165-.
- Photogrammetry. *Pizzighelli, —.* Wien Pht. Cor. 23 (1886) 119-, 199-, 251-, 404-.
- *Hafferl, F.* [1888] Wien Pht. Cor. 26 (1889) 95-.
- *Harris, C. H.* Aust. As. Rp. (1893) 595-.
- , geometrical theory. *Finsterwalder, S. D.* Mth. Vr. Jbr. 6 (1899) (Heft 2) 1-.

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- Zettnow, E.* Wien Pht. Cor. 27 (1890) 161-.
- Sporžinskij, K. M.* Vars. S. Nt. Tr. (1893-94) (C. R., Ps. C.) Nos. 4 & 5, 10-.
- Miethe, A.* Wien Pht. Cor. 35 (1898) 452-.
- achromatic, calculation of numerical elements. *Teynard, F.* C. R. 64 (1867) 1013-.
- , determination. *Forti, A. N.* Cim. 14 (1861) 377-.
- anastigmatic. *Goerz, C. P.* Phot. J. 17 (1893) 253-.
- , astigmatism remaining in some. *Hoëgh, E. von.* [1893] Phot. J. 18 (1894) 34-, 92-.
- , Goerz's double, compared with Zeiss's. *Miethe, —, Neuhaus, —, & Stolz, —.* Wien Pht. Cor. 30 (1893) 457-.
- , Voigtländer's triple. *Kaempfer, —.* Wien Pht. Cor. 35 (1898) 173-.
- , —. *Eder, J. M.* Wien Pht. Cor. 35 (1898) 594-.
- , Zeiss's. *Eder, J. M.* Wien Pht. Cor. 28 (1891) 267-.
- , —. *Rudolph, P.* Wien Pht. Cor. 30 (1893) 512-.
- antiplanatic, Steinheil's new rapid. *Eder, J. M.* Wien Pht. Cor. 31 (1894) 168-.
- aplanatic, with adjustable distance of lenses, Steinheil's. *Eder, J. M.* Wien Pht. Cor. 22 (1885) 277-.
- , baryta-, Waechter's. *Eder, J. M.* Wien Pht. Cor. 29 (1892) 592-.
- , and pantoscope, Hartnack's new. *Eder, J. M.* Wien Pht. Cor. 27 (1890) 461-.
- , wide-angle, application of prism. *Husnik, J.* Wien Pht. Cor. 17 (1880) 13-.
- catadioptric, for celestial photography. *Zenger, C. V.* As. Fr. C. R. (1889) (Pt. 2) 378-; C. R. 109 (1889) 474-.
- chroscope, Goerz's. *Eder, J. M.* Wien Pht. Cor. 28 (1891) 223-.
- "collinear", Voigtländer's. *Kaempfer, D.* Wien Pht. Cor. 31 (1894) 455-.
- "collinear", Voigtländer's. *Eder, J. M.* Wien Pht. Cor. 32 (1895) 6-.
- , —. *Höegh, E. von.* Wien Pht. Cor. 32 (1895) 103-.
- , — (Höegh). *Kaempfer, D., & Scheffler, H.* Wien Pht. Cor. 32 (1895) 158-.
- combination. *Cundell, G. S.* (vi Adds.) Ph. Mg. 25 (1844) 173-.
- concentric. *Schröder, —.* Phot. J. 16 (1892) 276-.
- conjugate distances, simple method of obtaining. *Lambert, (Rev.) F. C.* Phot. J. 24 (1900) 307-.
- construction. *Hunt, R.* [1853] Pht. S. J. 1 (1854) 14-.
- , *Aldis, H. L.* Phot. J. 24 (1900) 291-.
- , optical principles. *Grubb, T.* [1857] Pht. S. J. 4 (1858) 108-, 172-.
- daguerreotype, chemical and visual foci. *Lerebours, —.* C. R. 23 (1846) 634-.
- , —, —. *Lerebours, —, & Secretan, —.* C. R. 38 (1854) 789-.
- distance beyond which all objects will be in focus with given lens. *Salomons, (Sir) D.* Phot. J. 14 (1890) 47-.
- without distortion. *Sutton, T. B. A.* Rp. (1859) (pt. 2) 63-.
- double, new. *Listing, J. B.* Gött. Nr. (1865) 348-.
- equations, new form. *Jankó, P. von.* Wien Pht. Cor. 32 (1895) 488-.
- errors to be corrected. *Nelson, E. M.* Mer. S. J. (1898) 401-.
- euryscopic, perspective in photographs. *Oettingen, A. von.* Dorpat Sb. 8 (1889) 194-.
- , Voigtländer's. *Eder, J. M.* Wien Pht. Cor. 23 (1886) 12-.
- , —. *Angerer, V., et alii.* Wien Pht. Cor. 23 (1886) 359-.
- , —. *Eder, J. M.* Wien Pht. Cor. 26 (1889) 8-; 27 (1890) 553-.
- evolution. *Dallmeyer, T. R., & others.* Phot. J. 19 (1895) 221-.
- focal length, determination. *Porro, I. C. R.* 33 (1851) 50-.
- , —. *Schmidt, C. von.* Wien Pht. Cor. 25 (1888) 12-.
- , —. *Geršun, A. L.* Rs. Ps.-C. S. J. 25 (Ps.) (1893) 347; J. de Ps. 3 (1894) 573-.
- , —, from polar distance. *Müller, O.* Wien Pht. Cor. 29 (1892) 533-.
- focometer, use of Dallmeyer's. *Bolas, T.* [1899] Phot. J. 24 (1900) 107-.
- , —. *Mergier's. Amet, —.* As. Fr. C. R. (1892) (Pt. 1) 174-.
- focometry of positive or negative systems. *Dallmeyer, T. R.* [1898] Phot. J. 23 (1899) 70-.
- focus, depth. *Salomons, (Sir) D.* Phot. J. 12 (1888) 160-.
- , —. *Cheyney, W. A.* Franklin I. J. 128 (1889) 356-; 129 (1890) 470-.
- , — and diffusion. *Dallmeyer, T. R.* Phot. J. 12 (1888) 86-.
- , variable, Français's. *Eder, J. M.* Wien Pht. Cor. 27 (1890) 555-.
- Fritsch's. *Eder, J. M.* Wien Pht. Cor. 26 (1889) 11-.

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Fritsch's long focus. *Eder, J. M.* Wien Pht. Cor. 30 (1893) 284-.

globe, nature and advantages. *Sellers, C.* Silliman J. 35 (1863) 319-.

—, trial. *Hilgard, J. E.* (vi *Adds.*) U. S. Coast Sv. Rp. (1863) 206-.

Goerz's. *Eder, J. M.* Wien Pht. Cor. 28 (1891) 5-, 72-.

illumination in, de la Crouée's remedy for inequality. *Dallmeyer, T. R.* Phot. J. 19 (1895) 184-.

— focal plane. *Rohr, M. von.* Z. Instk. 18 (1898) 171-, 197-.

microscope objectives. *Nelson, E. M.* Mer. S. J. (1895) 498.

new form proposed by Steinheil. *Porro, I.* Mil. I. Lomb. Rd. 3 (1866) 99-.

optical centre. *Streints, H.* Wien Pht. Cor. 29 (1892) 553-.

"orthostigmat." *Anon.* Nt. 62 (1900) 188.

—, Steinheil's. *Eder, J. M.* Wien Pht. Cor. 34 (1897) 400-.

panoramic, theory. *Sutton, T.* Pht. S. J. 6 (1860) 187-.

paraplanatic, Goerz's rapid. *Eder, J. M.* Wien Pht. Cor. 28 (1891) 169-.

for photographic and stereoscopic portraiture. *Brewster, (Sir) D.* Pht. S. J. 7 (1862) 130-.

plano-convex. *Sutton, T.* Pht. S. J. 4 (1858) 252-.

portrait, Petzval's first. *Eder, J. M.* Wien Pht. Cor. 36 (1899) 274-.

—, Voigtländer's. *Harting, H.* Wien Pht. Cor. 37 (1900) 279-.

power. *Amann, J.* Laus. S. Vd. Bll. 35 (1899) xix-.

—, graphic method of representing. *Jankó, P. von.* Wien Pht. Cor. 33 (1896) 524-.

for reproduction of maps, etc. *Hannot, A.* Brux. Bll. Pht. 18 (1879) 164-.

simplified type. *Taylor, H. D.* [1894] Phot. J. 19 (1895) 64-.

single, corrected for architecture. *Taylor, J. T.* Phot. J. 12 (1888) 98-.

spectacle lenses as. *Eder, J. M.* Wien Pht. Cor. 30 (1893) 386-.

spherical aberration, possible introduction. *Dallmeyer, T. R.* Phot. J. 13 (1889) 108-.

standards of Phot. Soc., Dallmeyer's proposed alteration. *Cadett, J.* Phot. J. 11 (1887) 116-.

for stellar photography. *Pickering, E. C.* Nt. 36 (1887) 562; 37 (1888) 558-.

— — —. *Grubb, H.* Nt. 37 (1888) 439.

— — —, with reduced secondary spectrum. *Harting, H.* Z. Instk. 19 (1899) 269-.

stigmatic, and astigmatic corrector. *Dallmeyer, T. R.* Phot. J. 21 (1897) 167-.

—, — astigmatism. *Aldis, H. L.* Phot. J. 20 (1896) 117-.

stops, iris diaphragms. *Boas, H.* Z. Instk. 15 (1895) 443-.

and stops and perspective. *Baugh, J. H. A.* Phot. J. 24 (1900) 326-.

stops, standard. *Addenbrooke, —.* Phot. J. 8 (1884) 52-.

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Beacons and buoy lamps, means of causing flashes. Wigham, J. R. [1899] Dubl. S. Sc. P. 9 (1899-1902) 76-.

—, illumination by electricity. Stevenson, T. (C. E.) [1867] Edinb. Sc. S. Arts T. 7 (1868) 306-.

Electric lighting, coast of France. Boulart, L. Rv. Sc. 1 (1881) 226-.

— — — Guérout, A. Lum. Élect. 5 (*1881) 25-.

Illuminating Apparatus for Lighthouses.

(See also 6080.)

Drummond, T. Phil. Trans. (1830) 383-.

Barlow, W. H. Phil. Trans. (1837) 211-.

Stevenson, T. Edinb. N. Ph. J. 1 (1855) 273-; 13 (1861) 273-.

Masselín, A. (vi Adds.) ME. I. P. (1862) 48-.

Stevenson, T. (C. E.) [1867] Edinb. Sc. S. Arts T. 7 (1868) 540-.

Fraser, A. Medley I. Eng. 5 (1868) 2-.

Swan, W. Edinb. T. Sc. S. Arts 7 (1868) 473-; 507-.

Stevenson, T. (C. E.) [1871-75] B. A. Rp. (1871) (Sect.) 37-; Nt. 12 (1875) 333-; Sc. S. Arts T. 9 (1878) 321-.

Lepaute, H. (Jls). As. Fr. C. R. (1877) 223-.

Stevenson, T. (C. E.) [1879] Nt. 21 (1880) 156-.

Harcourt, A. V. Nt. 35 (1887) 41-, 60-.

Schöpfleuthner, —. Dingler 277 (1890) 297-.

Kemward, J. Science 21 (1893) 216-.

Rivière, —. A. Pon. Chauss. 8 (1894) 190-; (1897) (Trim. 4) 116-.

Purves, J. A. Nt. 61 (1899-1900) 393-.

annular lenses. Wigham, J. R. Dubl. S. Sc. P. 6 (1888-90) 525-.

combination of mirrors used to augment illuminating power, Madras. Smith, John T. Madras J. 9 (1839) 273-.

— — polygonal lenses with plain mirrors. Brewster, (Sir) D. [1827] Edinb. R. S. T. 11 (1831) 33-.

dioptric. Fresnel, A. J. Par. S. Phlm. Bil. (1822) 123-.

— (Fresnel's). Lovering, J., & Peirce, —. Franklin I. J. 18 (1849) 249-.

— Brebner, A. (jun.) I. CE. P. 70 (1882) 386-.

— for catoptric. Melloni, M. (vi Adds.) Majocchi A. Fis. C. 24 (1846) 321-; 25 (1847) 105-, 214-, 318-; 26 (1847) 101-, 216-, 324-; 27 (1847) 100-.

— and catoptric. Grunert, J. A. Grunert Arch. 19 (1852) 241-.

— — and catadioptric. Hamilton, W. Franklin I. J. 18 (1849) 67-, 161-, 240-, 335-.

—, for electric light. Chance, J. T. I. CE. P. 57 (1879) 168-.

—, improvements. Douglass, W. T., & Purves, J. A. I. CE. P. 137 (1899) 131-.

—, Kirkaldy Harbour. Sang, E. Edinb. N. Ph. J. 25 (1838) 249-.

—, progress. Stevenson, C. A. Nt. 46 (1892) 514-.

—, spherical refractor for. Stevenson, C. A. [1888] Sc. S. Arts T. 12 (1891) 219-.

for dipping lights. Brebner, A. I. CE. P. 78 (1884) 361-.

double holophote. Brewster, (Sir) D. Edinb. R. S. T. 24 (1867) 635-.

eclipsing, Belfast Lough. Bottomley, W. B. A. Rp. (1874) (Sect.) 220-.

electric. Secchi, A. N. Cim. 3 (1856) 394-.

— Faraday, M. [1860] R. I. P. 3 (1858-62) 220-.

— Reynaud, L. A. Tél. 6 (1863) 369-.

— Douglass, (Sir) J. N. I. CE. P. 57 (1879) 77-.

— Petit, P. L. N. L. Brux. A. Tr. Pbl. 37 (1880) 261-.

— (for lighthouses and ships). Common, A. A. Nt. 81 (1885) 125-.

— Adams, W. G. Elect. 16 (1886) 57-, 76-, 97-, 115-, 135-.

— Hopkinson, J. Elect. 17 (1886) 518-.

— Blondel, A. Elect. 31 (1893) 478-.

- electric, Isle of May. *Stevenson, D. A. I. ME. P.* (1887) 347-.
- , La Hève. *Quinette de Rochemont, —. A. Pon. Chauss.* 19 (1870) 309-.
- , Macquarie and Tino. *Hopkinson, J. I. CE. P.* 87 (1886) 243-.
- , objections. *Allard, E. A. Pon. Chauss.* 3 (1882) 489-.
- , Penmarch-Eckmuhl. *Du Riche Preller, O. Sc. Abs.* 1 (1898) 673-.
- fixed, new system. *Smith, (Col.) John T. Madras Eng. Rp.* 1 (1839) 41-; *R. E. Pp.* 5 (1842) 56-.
- and occulting. *Kenward, J.* [1890] *Birm. Ph. S. P.* 7 (1889-91) 233-.
- gas for. *Wigham, J. R.* [1872] (xi) *Dubl. S. J.* 6 (1875) 192-.
- lamp, double quadriform. *Barrett, W. F.* [1886] *Dubl. S. Sc. P.* 5 (1886-87) 74-.
- lamps, improved forms. *Wigham, J. R.* [1891] *Dubl. S. Sc. P.* 7 (1891-92) 147-.
- holophotal system. *Stevenson, T. Edinb. T. Sc. S. Arts* 4 (1856) 1-.
- hyper-radial and other lenses. *Kenward, J. Birm. Ph. S. P.* 6 (1887-89) 213-.
- improvements. *Roberts, R.* [1859] *Manch. Ph. S. Mm.* 15 (1860) 166-.
- *Anon.* [1895] *Nt.* 53 (1895-96) 56-.
- Kitson light. *Wigham, J. R.* [1900] *Dubl. S. Sc. P.* 9 (1899-1902) 471-.
- lamps, continuous, method of increasing power. *Wigham, J. R.* [1894] *Dubl. S. Sc. P.* 8 (1893-98) 347-.
- lenses, relative powers. *Brebner, A. I. CE. P.* 111 (1893) 296-; 122 (1895) 300-.
- magneto-electric. *Gladstone, J. H. QJ. Sc.* 1 (1864) 70-.
- oil for. *Macadam, S.* [1878] *Sc. S. Arts T.* 10 (1883) 56-.
- refraction protractor, and application to designing of prisms. *Balfour, J. M.* [1857] (vi *Adds.*) *Edinb. T. Sc. S. Arts* 5 (1861) 95-.
- refractors. *Stevenson, C. A. I. CE. P.* 117 (1894) 341-.
- revolving light in harbour of Porto d'Anzio. *Linotte, L. G. Arcad.* 23 (1824) 32-.
- lights, masking for any bearing. *Stevenson, T. (C. E.) Nt.* 23 (1881) 560-.
- semi-horizon, eclipsing. *Smith, (Col.) John T. CE. I. T.* 2 (1838) 193-; *R. E. Pp.* 5 (1842) 41-.
- , — and fixed. *Thomson, J. T. J. I. Archip.* 6 (1852) 94-.
- semi-revolving. *Thomson, J. T. Edinb. T. Sc. S. Arts* 4 (1856) 306-.
- sideral lamp. *Löwenörn, P. de.* (vi *Adds.*) *Kiöb. Ov.* (1822-23) 2-.
- — *Gaudin, A. C. R.* 22 (1846) 170-.
- Lighthouses.*
- Arago, D. F. J. A. C.* 37 (1828) 392-; *Par. Bur. Long. An.* (1831) 172-.
- Hess, A. Crelle J. Bauk.* 29 (1850) 70-, 93-, 191-, 349-; 30 (1851) 56-.
- Cowper, —.* [1851] *R. I. P.* 1 (1851-54) 24-.
- Veit-Meyer, —.* [1854] *Berl. Pol. Gs. Vh.* 16 (1855) 18-.
- Purves, J. A.* [1899] *Glasg. I. Eng. T.* 43 (1900) 19-.
- and beacons and buoys, etc. *Sautter, L. Rv. Mar. et Col.* 70 (1881) 299-, 561-; 71 (1881) 502-.
- Bell Rock. *Stevenson, R. Edinb. Ph. J.* 12 (1825) 18-.
- deep-sea. *Anderson, C.* [1883] *Eng. S. T.* (1884) 45-.
- Denmark. *Löwenörn, P. de. Kiöb. Dn. Vd. Selsk. Skr.* 1 (1800) (*Heft* 2) 179-; 4 (1805-06) (*Heft* 2) 41-, 119-; *Kiöb. Dn. Vd. Selsk. Afh.* 1 (1824) 81-; 2 (1826) 1-.
- and Norway. *Anon.* (vi 1125) *Schröder B. Zeev.* 3 (1823) 54-.
- Eddystone. *Douglass, W. T.* [1888] *I. CE. P.* 75 (*1884) 20-.
- floating and fixed. *Stevenson, D. Franklin I. J.* 31 (1856) 221-.
- , new. *Fryer, A.* [1860] *Manch. Ph. S. Mm.* 1 (1862) 158-.
- , "Wandelaar," and fog signal apparatus. *Boulvin, J. Brux. A. Tr. Pbl.* 41 (1884) 415-.
- formulæ and tables for calculating range of light. *Gyldén, H. Stockh. Öfv.* 29 (No. 1) (1872) 71-.
- at high elevations, vertical distribution of light. *Stevenson, T. (C. E.)* [1878] *Nt.* 19 (1879) 19-.
- Horsburgh. *Thomson, J. T. J. I. Archip.* 6 (1852) 376-.
- intensity and distance of projection of light. *Allard, E. A. Pon. Chauss.* 12 (1876) 5-.
- iron, history and construction. *Merrick, J. V. Franklin I. J.* 31 (1856) 145-.
- Italian, ancient and modern. *Cialdi, A. Rm. N. Linc. At.* 30 (1877) 303-.
- North British. *Stevenson, R. Edinb. N. Ph. J.* 15 (1833) 108-.
- visibility of lights in rapid motion. *Stevenson, A. Edinb. N. Ph. J.* 32 (1842) 270-.
- Colorimetric double pipette. *Hoppe-Seyler's. Albrecht, E. Z. Instk.* 12 (1892) 417-.
- Colour, form and motion, reproduction. *Cros, C. C. R.* 82 (1876) 1515; 83 (1876) 291-.
- Concentrator, pyramidal, for solar rays. *De-laurier, É.* [1882] *Les Mondes* 4 (1883) 253-.
- Cyclostat for observation of rapidly rotating bodies. *Thury, —. Arch. Sc. Ps. Nt.* 15 (1886) 141-.
- Diacatoptron. *Gibbes, G. S. Tilloch Ph. Mg.* 39 (1812) 127-.
- Dicatopter, von Hagenow's patent. *Emsmann, H. Pogg. A.* 88 (1853) 242-.
- Dipleidoscope and passage-prisms. *Kühn, O. Czgt. Opt.* 7 (1886) 169-.
- , theory. *Grunert, J. A. Grunert Arch.* 5 (1844) 343-.
- Displacements, small, experimental arrangement for measuring. *Right, A. Bologna Rd.* 1 (1897) 185-.
- Drawing objects natural size, apparatus for. *Bausch, H. Mer. S. J.* (1900) 734-.
- Elementary optics, apparatus for demonstration of laws. *Gariel, C. M. As. Fr. C. R.* 3 (1874) 244-; 8 (1879) 423-.

- Firing arrangement, optical, for covered batteries. *Frayseix, B. de.* C. R. 90 (1880) 1350-.
- Flexure, new optical apparatus for studying. *Lacey, M., & Tresca, H. E.* C. R. 95 (1882) 1114-.
- Focometer. *Snellen, H.* Donders Ndl. Gast. Oogl. Vs. 17 (1876) 204-.
- , *Abbe's. Czapski, S. Z.* Instk. 12 (1892) 185-.
- , new. *Mergier, G. E.* As. Fr. C. R. (1886) (Pt. 1) 100; Par. S. Ps. Sé. (1887) 193-.
- , —. *Everett, J. D. L.* Ps. S. P. 12 (1894) 180-; Ph. Mg. 35 (1893) 333-.
- , —. *Guilloz, T.* As. Fr. C. R. (1895) (Pt. 2) 410-.
- , universal. *Weiss, G.* Par. S. Ps. Sé. (1895) 35-.
- Fountain, luminous. *Trouvé, G.* C. R. 113 (1891) 596-; 115 (1892) 424-.
- Gauss plate, most favourable position. *Walter, B. A.* Ps. C. 52 (1894) 762-.
- Glass cell with parallel sides. *Clowes, F.* Ph. Mg. 48 (1874) 61-.
- , varnish to facilitate writing on. *Terquem, A.* Par. S. Ps. Sé. (1876) 114-.
- Heliastron or solar-compass. *Watt, M.* Edinb. N. Ph. J. 4 (1828) 16-.
- Iconographic apparatus. *Vanghetti, G. Z.* Ws. Mkr. 10 (1893) 457.
- Image-finder, automatic. *Bodkin, (Rev.) R. C.* [1894] *Dubl. S. Sc. P.* 8 (1893-98) 281-.
- Internal reflection in glass rod used for illumination of cavities. *Robison, (Sir) J. B. A.* Rp. (1842) (pt. 2) 27.
- Kaleidopolariscope. *Petrina, F. A.* Pogg. A. 49 (1840) 236-.
- Kaleidoscope. *Bradley, R.* Tilloch Ph. Mg. 51 (1818) 376-.
- , *Brewster, (Sir) D.* Bb. Un. 8 (1818) 155-.
- , *Gilbert, L. W.* Gilbert A. 59 (1818) 341-.
- , *Playfair, J.* QJ. Sc. 5 (1818) 324-.
- , *Roget, P. M.* Thomson A. Ph. 11 (1818) 375-.
- , *Vallot, J. N.* Dijon Sé. Ac. (1818) 106-.
- , *Wurzer, F.* Gilbert A. 59 (1818) 368-.
- , *Mack, K.* Exner Rpm. 21 (1885) 567-.
- and its application to the arts. *Luca, P. A. de.* Il Progresso 14 (1836) 82-; Nap. Rd. 1 (1842) 66 (166)-.
- , problem. *Weiss, A.* Pogg. A. 84 (1851) 145-.
- Kaloscope. *Heys, W. H.* [1861] *Manch. Ph. S. Mm.* 1 (1862) 234-.
- Kinematograph, electric. *Nicholl, W.* Belfast N. H. S. Rp. & P. (1896-97) 62-.
- Kinematography, Marey's apparatus. *Hermann, —.* Königsb. Schr. 36 (1895) [15].
- Lactoscope. *Séguier, A.* C. R. 17 (1843) 585-.
- Laryngoscope, history. *Blumgrund, E.* Cztg. Opt. 20 (1899) 32-.
- Magnification of dioptric apparatus, instrument for experimental demonstration of theory. *Mergier, E.* Par. S. Ps. Sé. (1886) 60-.
- optical instruments, apparatus for measuring. *Govi, G.* [1863] (vii) *Tor. Mm. Ac.* 23 (1866) 455-.
- , —, —. *Oberbeck, A.* N.-Vorp. Mt. 19 (1888) 71-.
- Magnifying apparatus. *Schilberszky, K. (jun.)* Term. Közl. 22 (1890) (Suppl.) 47-.
- Measuring instruments with movable mirror showing image of fixed scale in telescope, determination of angle of rotation. *Stegmann, F.* Grunert Arch. 25 (1855) 376-.
- Micrometers, methods of cutting rock-crystal for. *Wollaston, W. H.* Phil. Trans. (1820) 126-.
- , prismatic. *Amici, G. B.* Zach. Cor. 8 (1823) 67-.
- Micrometric measurement by optical images. *Abbe, E.* [1878] *Jena. Sb.* (1879) xi-.
- Mirror method, modification of Poggendorff's. *Du Bois, H. E. J. G.* A. Ps. C. 38 (1889) 494-.
- reading, apparatus for illuminating scales. *Kamerlingh Onnes, —.* Amst. Ak. Vs. 4 (1896) 311-; Arch. Néerl. 1 (1898) 405-.
- Mirror-lineal. *Reusch, F. E. von.* Carl Rpm. 16 (1880) 255-.
- Momentary attitudes, rapid view instrument for. *Galton, F.* Nt. 26 (1882) 249-.
- Monochromatoscope. *Thierry, M. de.* C. R. 118 (1894) 636-.
- Monostereoscope. *Boblin, A.* Brux. Ac. Bll. 5 (1858) 304-.
- , *Boblin's. Scarpellini, C.* Rm. Cor. Sc. 5 (1859) 137.
- Multireflector for use with galvanometers, etc. *Ayrton, W. E., & Perry, J.* Lum. Élect. 5 (*1881) 38-.
- Optical experiment (wheels rotating in opposite directions). *Arago, F.* Rv. Mar. et Col. 46 (1875) 444-.
- instrument, new (combining compound microscope, camera lucida, etc.). *Waddell, A.* Edinb. Ph. J. 5 (1821) 143-.
- model illustrating character of vibrations in crystal cut parallel to axis, when plane-polarised light is incident upon it. *Rücker, A. W.* L. Ps. S. P. 10 (1890) 11-.
- surfaces, working. *Gautier, P. J. de Ps.* 8 (1899) 477-.

OPTICAL TELEGRAPHY.

- Anon. [1788] (vi 11) *Am. Ph. S. T.* 4 (1799) 162-.
- Cooke, J. [1794] *Ir. Ac. T.* 6 (1797) 77-.
- Edgeworth, R. L. [1795-96] *Ir. Ac. T.* 6 (1797) 95-, 313-.
- (Bréguet and Bétancourt.) [*Lagrange, J. L., et alii non*] *Lagrange, J. L., & Legendre, —.* Par. Mm. de l'I. 3 (1800-01) 22-.
- Carney, J. A. Mntp. Rec. Bll. 2 (1805) 289-.
- Lamanon, P. J. de Ps. 65 (1807) 5-.
- Pasley, (Sir) C. W. Tilloch Ph. Mg. 29 (1807) 205-, 292-.
- Le Hardy, C. Tilloch Ph. Mg. 33 (1809) 343-.
- Edgeworth, R. L. Nicholson J. 26 (1810) 181-.
- Parrot, G. F. [1834] *St Pét. Ac. Sc. Mm.* 3 (1838) 239-.
- Laussedat, A. As. Fr. C. R. (1874) 1267-.
- Léard, A. A. Tél. 2 (1875) 379-.
- Mercadier, E. Lum. Élect. 2 (*1880) 146-, 502-; A. Tél. 7 (1880) 5-, 118-, 544-; 8 (1881) 44-, 167-.
- Nansouty, M. de. Gén. Civ. 7 (1885) 116-, 133-, 150-.

3090 Optical Apparatus

- Bouchard, E. A. Tél. 14 (1887) 342-.
- Dieudonné, E. Lum. Élect. 26 (1887) 423-.
- automatic receiver. *Ducretet, E.* C. R. 105 (1887) 664-.
- transmission and reception of messages by. *Martin de Brettes, J. B.* C. R. 95 (1882) 25-.
- best source of light. *Ellie, R.* Bordeaux S. Sc. PV. (1894-95) 75-.
- in France (semaphores and lamps). *Lambel, — (comtede).* Par. Bil. S. Encour. 44 (1845) 228-.
- heliograph. *Anderson, T. B. A.* Rp. (1880) 461-.
- *Blakesley, T. H.* [1887] Ün. Serv. I. J. 31 (1887-88) 593-.
- for U.S. military service. *Grugan, F. C.* [U.S.] Chief Sig. Off. A. Rp. (1882) (Pt. 1) 95-.
- heliographic. *Leseurre, J. A.* Tél. 1 (1856) 113-, 137-.
- heliostat, hand-. *Galton, F.* [1858] Gg. S. P. 4 (1860) 14-.
- in Holland. *Staring, W. C. A.* 's Gravenh. I. Ing. Ts. (1890-91) (Vh.) 279-.
- intermittent signals, method of producing. *Crova, A.* C. R. 91 (1880) 1061-.
- , methods of producing. *Mercadier, E.* C. R. 91 (1880) 982-; 92 (1881) 131-.
- between London and Dublin. *Hall, (Sir) J.* Tilloch Ph. Mg. 34 (1809) 124-.
- magnesium flash signals. *Regnard, P.* Par. S. Bl. Mm. 41 (1889) (C. R.) 297-.
- between Mauritius and Réunion. *Adam, L. P.* C. R. 95 (1882) 585-.
- — — (Adam's system). *Faye, H. A.* É. C. R. 96 (1883) 1763-.
- — —. *Bridet, —.* C. R. 99 (1884) 425-.
- nocturnal, French marine. *Méritens, A. de.* A. Tél. 12 (1885) 152-.
- telelogue. *Gaume, F.* Par. S. Gg. C. R. (*1882) 132-.
- Optigraph. *Jones, T.* Tilloch Ph. Mg. 28 (1807) 66-.
- Pantoscope. *Johnson, J. R.* Manch. Lt. Ph. S. P. 5 (1866) 135-.
- , Morochov's. *Timiriazov, K.* [1892] Mosc. S. Sc. Bil. 78 (No. 2) (1893) 4-.
- Perspective drawing, apparatus. *Hansen, W.* Dingler 130 (1853) 1-.
- Phakinescope for producing moving pictures. *Abadie-Dutemps, E.* Toul. Ac. Sc. Mm. 8 (1896) 555-.
- Phakometer, oscillatory. *Dévé, C.* C. R. 128 (1899) 1561-.
- Phantasmagoria, improvement. *Ritchie, W.* Edinb. J. Sc. 4 (1826) 37.
- Phantasmascopes. *Walker, Ez.* Tilloch Ph. Mg. 27 (1807) 97-.
- Phenakistoscope. *Plateau, J. A. F.* A. C. 53 (1833) 304-.
- *Holten, C.* Sk. Nf. F. 8 (1860) 565-.
- Photochromoscope (heliochromoscope). *Ives, F. E.* [1892] Franklin I. J. 135 (1893) 35-.
- (Ives's). *Eder, J. M.* Wien Pht. Cor. 30 (1893) 572-.
- *Ives, F. E.* [1896] Sc. S. Arts T. 14 (1898) 136-.
- (Ives's). *Heinemann, G.* D. Nf. Vh. (1898) (Th. 2, Hälfte 1) 173-.

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- Photochromoscope (Ives's). *Hagenbach, A.* Bonn Niedr. Gs. Sb. (1899) 14-.
- (—). *Petruschky, —.* [1899] Danzig Schr. 10 (1899-1902) (Hefte 2 & 3) xx-.
- (—). *Lakowitz, C.* [1899] Danzig Schr. 10 (1899-1902) (Hefte 2 & 3) xxviii.
- Photoelectric apparatus maintaining light at same point. *Jaspar, J.* Brux. Ac. Bil. 20 (1853) 478-.
- Plane, parallel, perpendicular and oblique surfaces, optical apparatus to control. *Laurent, L.* C. R. 96 (1883) 1035-.
- plates, manufacture. *Pistor, C. H.* Gilbert A. 49 (1815) 161-.
- , testing. *Kundt, A.* Pogg. A. 120 (1863) 46-.
- — —, apparatus. *Oertling, A.* Pogg. A. 59 (1843) 284-.
- — —, —. *Halle, G. D. Nf. Vh.* (1897) (Th. 2, Hälfte 1) 127-.
- Prism adjustment, Wollaston's method. *Pulfrich, C. A.* Ps. C. 31 (1887) 734-.
- , — (Pulfrich). *Hecht, B. A.* Ps. C. 32 (1887) 275-.
- , reversion-, as terrestrial ocular and for measuring angles. *Dove, H. W.* Pogg. A. 83 (1851) 189-.
- , —, theory. *Wanach, B.* Z. Instk. 19 (1899) 161-, 224.
- Prisms, applications. *Hodgson, W.* Edinb. N. Ph. J. 52 (1852) 137-.
- , —. *Bohn, C.* Z. Instk. 8 (1888) 359-.
- , crossed. *Bohn, C.* Z. Instk. 9 (1889) 62-.
- , —, of Starke and Kammerer. *Lorber, F.* Z. Instk. 8 (1888) 283-.
- , Luxfer. *Anon. Rv. Sc.-Ind.* 32 (1900) 150-.
- , —. *Anon. Rv. Sc.-Ind.* 32 (1900) 195-.
- , —, illuminative power. *Anon. Rv. Sc.-Ind.* 32 (1900) 257-.
- , right-angled, precision apparatus for measuring. *Halle, G. D. Nf. Vh.* (1897) (Th. 2, Hälfte 1) 125-.

PROJECTION APPARATUS.

- Uchatius, F.* Wien SB. (1853) 482-.
- Mach, E.* Carl Rpm. 7 (1871) 261-.
- Vogel, H.* D. C. Gs. B. 6 (1873) 1345-.
- Laurent, L.* Par. S. Ps. Sé. (1877) 80-.
- Arsonval, A. d'.* Par. S. Bl. Mm. 37 (1885) (C. R.) 212.
- Salomons, (Sir) D.* [1892] R. I. P. 13 (1893) 534-.
- Möhlenbruck, H.* Laus. S. Vd. Bl. 33 (1897) xxiv-.
- Behrens, W.* Z. Ws. Mkr. 15 (1898) 7-.
- Measures, J. W.* Mer. S. J. (1900) 267-.
- Uthoff, —.* Bresl. Schl. Gs. Jbr. (1900) (Ab. 1a) 118-.
- absorption of heat. *Zoth, O.* Z. Ws. Mkr. 10 (1893) 152-.
- acetylene lamp, Gossart's. *Rocourt, — de.* Toul. S. H. Nt. Bil. (1897) 244-.
- , portable. *Jehl, F.* Toul. S. H. Nt. Bil. (1897) 243-.
- arc lamp. *Rühlmann, R.* Elekttech. Z. 6 (1885) 300-.
- suitable for Duboseq lantern. *Thompson, S. P.* L. Ps. S. P. 8 (1887) 184-; Ph. Mg. 23 (1887) 333-.

- are light, adaptation to projection. *Laudy, L. H.* N. Y. Ac. T. 10 (1890-91) 103-.
- , reflecting and direct acting polariscope for. *Knipe, O.* Science 22 (1893) 272.
- combination. *Hughes, W. C.* Mer. S. J. (1889) 117-.
- condensers. *Henry, L. d'* (xii) Lille S. Mm. 5 (1868) 5-.
- construction and uses. *Anon.* Elect. 30 (1893) 713-, 739-.
- diorama, portable. *Tait, G.* Edinb. N. Ph. J. 32 (1842) 142-.
- electric couple for. *Cole, A. D.* Denison Un. Sc. Lib. Bll. 5 (1890) 20-.
- ether-oxygen. *Pellin, P.* Par. S. Ps. Sé. (1891) 171.
- , new form. *Prowse, G. R.* [1891] Cn. R. S. P. & T. 9 (1892) (Sect. 3) 55-.
- explosion of Bourdon manometer. *Lacaze-Duthiers, —.* C. R. 125 (1897) 12-.
- for horizontally placed bodies. *Duboscq, J.* Par. S. Ps. Sé. (1876) 6-.
- incandescent light (Welsbach) with oxygen supply attachment. *Penman, W.* [1895] Sc. S. Arts T. 14 (1898) 43-.
- lighting by primary batteries. *Dresser, A. R.* Phot. J. 10 (1886) 91-.
- megascopes, Charles's. *Hombres-Firmas, L. A. d'.* Gard Not. Tr. Ac. (1807) 143-.
- , new form. *Knight, J. B.* Franklin I. J. 73 (1877) 335-.
- for monochromatic and mixed light. *Abney, (Capt.) W. de W.* L. Ps. S. P. 7 (1886) 181-; Ph. Mg. 20 (1885) 172-.
- Newtonian. *Anon.* Mer. S. J. (1898) 678-.
- photometric properties of lenses. *Blondel, A.* As. Fr. C. R. (1899) (Pt. 2) 316-.
- with polarised light. *Laurent, L. C. R.* 85 (1877) 1162-.
- polarising, modification of Soleil's. *Lovering, J.* Am. As. P. (1853) 24-.
- for projecting spectra. *Pellin, —.* Par. S. Ps. Sé. (1888) 305.
- rectifying apparatus, Duboscq's. *Bertin, A.* Par. S. Ps. Sé. (1879) 73-.
- slides, coloured projections of uncoloured. *Vidal, L.* Par. S. Ps. Sé. (1892) 214-.
- , colouring. *Scott, J. A.* [1894] Dubl. S. Sc. P. 8 (1893-98) 263-.
- , preparation (Woodbury process). *Smith, G.* [1886] Phot. J. 11 (1887) 22-.
- , —. *Stanley, W.* Manch. Mer. S. T. (1886) 67-.
- stereoscopic. *Moissard, —.* C. R. 120 (1895) 1108-.
- , *Bryan, G. H.* Nt. 57 (1897-98) 511.
- , d'Almeida's. *Moravf, E.* Wien Pht. Cor. 28 (1891) 163-.
- turntable. *Müller, F.* Z. Ws. Mkr. 17 (1900) 162-.
- with variable magnification. *Crova, A. J.* de Ps. 10 (1881) 158-.
- Pseudoscope, new form. *Wood, R. W.* Science 10 (1899) 648-.
- , single picture. *Salomons, (Sir) D.* Nt. 57 (1897-98) 317-.
- Railway signals. *Stevenson, A.* Edinb. N. Ph. J. 30 (1841) 347-.
- , *Treutler, G. A.* Dingler 99 (1846) 84-.
- Reflecting instruments. *Dantas Pereira, J. M.* Lisb. Mm. Ac. Sc. 2 (1799) 159-.
- , apparent motion of image when turned round optic axis. *Dubois, E.* Les Mondes 10 (*1866) 306-.
- , correction of errors of eccentricity. *Hilleret, G.* Rv. Mar. et Col. 87 (1885) 237-, 482-.
- for measuring small angles, magnification. *Lermantov, V. V.* Rs. Ps. C. S. J. 22 (Ps.) (1890) 261-; Fschr. Ps. (1890) (Ab. 2) 206.
- , theory. *Čubr [Czuber], E.* Časopis 2 (*1873) 233-; Bll. Sc. Mth. As. 8 (1875) 124-.
- Refractoscope, crystal. *Pulfrich, C. A.* Ps. C. 30 (1887) 317-.
- Rotary motion, optical method of investigating. *Clarke, (Lt.) G. S.* [1877] Camb. Ph. S. P. 3 (1880) 90-.
- Search lights with parabolic glass-mirrors. *Anon.* Elekttech. Z. 11 (1890) 371-.
- Sextant. *Hermans, H.* Brux. A. Tr. Pbl. 1 (1896) 41-.
- for accurate observations. *Schweyer, (lt.) A.* Rv. Mar. et Col. 105 (1890) 80-.
- , adjustment of mirror. *Braun, C. Z.* Instk. 8 (1888) 238-.
- , errors when mirrors are not perpendicular to graduated arc. *Lemoch, I.* Grunert Arch. 25 (1855) 167-.
- , and use. *Kayser, E.* [1892] Danzig Schr. 8 (1892-94) (Heft 1) 155-.
- , lighting arrangement for vernier, for night observations. *Besson, —.* Rv. Mar. et Col. 87 (1885) 602-.
- for night observations, binocular. *Cuerville, C. de.* Rv. Mar. et Col. 83 (1884) 171-.
- — —, modification. *Blanchin, —.* Rv. Mar. et Col. 80 (1884) 731.
- "Simmetrizzatore" as universal kaleidoscope and as educational instrument. *Luca, P. A. de.* Nap. Rd. 3 (1844) 161-.
- Spherometers, prismatic. *Meyerstein, M. A.* Ps. C. 126 (1865) 589-; D. Nf. B. 40 (1865) 104.
- Stepped lens, theory. *Matthiessen, L.* Cztg. Opt. 7 (1886) 109-.
- Stereometer. *Marie, T., & Ribaut, H.* C. R. 128 (1899) 1008-.
- Stereomonscope, by which single picture produces stereoscopic effect. *Claudet, A.* [1858] R. S. P. 9 (1857-59) 194-.

STEREOSCOPE.

(See also 4440.)

Projection of images formed between 2 plane mirrors. *Bibart, É.* J. de Ps. 9 (1880) 11-.

— and increase of light. *Lester, —.* Tilloch Ph. Mg. 52 (1818) 68-.

Faye, H. A. É. C. R. 43 (1856) 673-.

Almeida, J. C. d'. C. R. 47 (1858) 61-.

Pick, H. Wien Schr. Vr. Nw. Kennt. 2 (1861-62) 297-.

3090 Stereoscope

- Stroh*, A. R. S. P. 40 (1886) 317-; 41 (1887) 274.
Righi, A. Rm. R. Ac. Linc. Rd. 5 (1889) (Sem. 1) 862-.
 and its applications. *Himes*, C. F. Franklin I. J. 123 (1887) 398-, 425-.
 — binocular vision. *Wheatstone*, (Sir) C. B. A. Rp. (1838) (pt. 2) 16-.
 — —. *Tyndall*, J. [1856] Pht. S. J. 3 (1857) 96-, 116-, 167-.
 — —. *Newton*, J. Lanc. T. Hist. S. 9 (1857) 272-.
 — —. *Claparède*, E. Bb. Un. Arch. 3 (1858) 138-.
 — —. *Donkin*, W. F. Phot. J. 12 (1888) 45-.
 — —. *Blath*, L. Magdeb. Nt. Vr. Jbr. u. Ab. (1894-96) 69-.
 diaphragmatic. *Volpicelli*, P. Rm. At. 7 (1853-54) 219-, 275-; N. Cim. 12 (1860) 181-.
 improvements. *Grubb*, (Sir) H. [1879] Dubl. S. Sc. P. 2 (1880) 179-.
 for large pictures, 2 new forms. *Elliot*, J. (vi Add.) Ph. Mg. 13 (1857) 104-.
 lenses and spectacles. *Berger*, E. D. Ps. Gs. Vh. (1900) 160-.
 lenticular, improvement. *Emerson*, E. Silliman J. 32 (1861) 403-.
 mathematics. *Steinhausner*, A. Carl Rpm. 13 (1877) 433-.
 modification. *Oppel*, J. J. (vi Add.) Frkf. Jbr. Ps. Vr. (1855-56) 37-; (iv) (1858-59) 22-.
 with movable pictures. *Halske*, G. G. Pogg. A. 100 (1857) 657-.
 photographs giving exact perspective. *Cazes*, —. Par. S. Ps. Sé. (1885) 115-.
 — of moving point. *Marey*, —. Par. S. Ps. Sé. (1885) 67-.
 pictures with one camera. *Dickson*, R. [1855] Pht. S. J. 2 (1856) 170-.
 —. *Chimenti*. *Reade*, J. B. [1862] Pht. S. J. 8 (1864) 29-.
 as platoscope. *Oppel*, J. J. Frkf. Jbr. Ps. Vr. (1858-59) 64-.
 prismatic and reflecting. *Dove*, H. W. Pogg. A. 83 (1851) 183-.
 reversible. *Stevens*, W. Le C. N. Y. Ac. T. 1 (1881-82) 118-; Am. J. Sc. 23 (1882) 226-.
 — and adjustable. *Stevens*, W. Le C. Ph. Mg. 13 (1882) 322-.
 with rotating prisms. *Schweder*, G. Riga Cor.-Bl. 40 (1898) 95-, 97-.
 theory. *Stevens*, W. Le C. Franklin I. J. 84 (1882) 279-.
 —. *Righi*, A. Bologna Ac. Sc. Mm. 2 (1891) 251-.
 —. *Marie*, T., & *Ribaut*, H. C. R. 127 (1898) 321-.
 use of camera lucida as. *Wilde*, E. Pogg. A. 85 (1852) 63-.
 Wheatstone's catoptric and Brewster's dioptric. *Massimo*, M. (viii) Rm. At. 4 (1850-51) 140-.

Telemeters 3090

- Stroboscopic discs, phenakistoscope, phantascopes. *Poggendorff*, J. C. Pogg. A. 32 (1834) 636-.
 — phenomena. *Fischer*, O. Ph. Stud. 3 (1886) 128-.
 —. *Marbe*, K. Ph. Stud. 14 (1898) 376-.
 —. *Dürr*, E. Ph. Stud. 15 (1900) 501-.
 Teinoscope for altering lineal proportions of objects. *Brewster*, (Sir) D. Edinb. Ph. J. 6 (1822) 334-.

TELEMETERS.

(See also Geography 87.)

- Fallon*, L. A. von. Zach M. Cor. 6 (1802) 246-.
Doppler, C. Böhm. Gs. Ab. 3 (1843-44) 769-.
Laurent, P. Nancy Mm. S. Sc. (1845) 58-.
Liagre, J. Brux. Ac. Bil. 20 (1853) 324-; 21 (1854) (pte. 2) 162-.
Rottermund, —. Par. S. Gl. Bil. 11 (1853-54) 230-.
Albertotti, G. Tor. Ac. Sc. At. 17 (1881) 749-.
Audouard, —. Brest S. Ac. Bil. 13 (1888) 173-.
Barr, A., & *Stroud*, W. B. A. Rp. (1890) 499-.
Drude, P. Z. Instk. 10 (1890) 323-.
Barr, A., & *Stroud*, W. I. ME. P. (1896) 33-.
Hensoldt, M. Cztg. Opt. 20 (1899) 191-; 21 (1900) 21-, 91.
Sprenger, E. Cztg. Opt. 20 (1899) 231-; 21 (1900) 41, 112.
Adie's. *Adie*, P. [1880] Un. Serv. I. J. 24 (1881) 230-.
Cerebotani's. *Börsch*, A. Z. Instk. 6 (1886) 77-, 125-.
 depression-. *Audouard*, P. Rv. Mar. et Col. 100 (1889) 5-; Brest S. Ac. Bil. 16 (1891) 159-; 17 (1892) 419-.
 —. *Bourgeois*, A. [1891] Brest S. Ac. Bil. 19 (1894) 237-.
 history. *Hammer*, E. Z. Instk. 12 (1892) 155-; 17 (1897) 278-.
Jaeger's. *Schneider*, E. Carl Rpm. 14 (1878) 487-.
 for measuring distance and altitudes. *Kérill*, —. de. Rv. Mar. et Col. 129 (1896) 216-.
 — variation of distance between 2 ships. *Jones*, T. Tilloch Ph. Mg. 22 (1805) 319-.
 method of utilising indications. *Audouard*, P. Rv. Mar. et Col. 118 (1893) 311-.
Porro's. *Hensoldt*, M. Z. Instk. 5 (1885) 413-.
 reflecting, with constant parallax. *Breton*, H. [1873] (xii) Isère S. Bil. 5 (1876) 266-.
Romershausen's. *Wiegand*, A. Grunert Arch. 13 (1849) 162-.
 stereocollimator. *Place*, — de. C. R. 116 (1893) 373.
 — (de Place's). *Arnoux*, R. C. R. 116 (1893) 508.

3100 Heterogeneous Media

stereoscopic, Zeiss's. *Pulfrich, C.* [1899] *Ps. Z.* 1 (1900) 98-
 —, —. *Frank, K.* *Cztg. Opt.* 21 (1900) 13-
 theory. *Lorber, F.* *Z. Instk.* 7 (1887) 89-
 —. *Goedseels, —.* *Brux. S. Sc. A.* 21 (1897)
 (Pt. 1) 110-.

Telemetrical spherometer and focometer. *Stroud, W.* [1897] *L. Ps. S. P.* 16 (1899) 1-, 206; *Ph. Mg.* 45 (1898) 91-
 Telestereoscope. *Helmholtz, H.* *Pogg. A.* 101 (1857) 494-; 102 (1857) 167-
 Testing cannon, optical method. *Jobin, —.* *Par. S. Ps. Sé.* (1897) 9-
 Total reflection method, application to micro-metric measurement of dispersion. *Pulfrich, C. Z. Instk.* 13 (1893) 267-
 —, —, — small and imperfect crystal faces. *Pulfrich, C. Z. Instk.* 19 (1899) 4-, 79-
 —, —, — (Pulfrich).
Leiss, C. Z. Instk. 19 (1899) 77-
 Typoscope. *Emsmann, H.* *Pogg. A.* 115 (1862) 157-
 Universal optical apparatus. *Rosenberg, V. L. Rs. Ps.-C. S. J.* 13 (Ps.) (1886) 168-; *Z. Instk.* 7 (1887) 323-
 Vertical vibration, arrangement for avoiding. *Julius, W. H.* [1897] *Z. Instk.* 18 (1898) 86-
 Zoetrope and its antecedents. *Carpenter, W. B. Stud.* 1 (1868) 427-; 2 (1869) 24-.

3100 Transmission through Heterogeneous Media.

(See also 3210.)

Curvature of path of ray, free paths. *Everett, J. D. B. A. Rp.* (1889) 498-
 Curvilinear rays, application to diffusion and conduction. *Wiener, O. A. Ps. C.* 49 (1893) 105-
 —, —, Maxwell's problem. *Matthiessen, L. Exner Rpm.* 24 (1888) 401-
 Heterogeneous cylinders, law of refraction. *Schwarz, A. Exner Rpm.* 21 (1885) 702-
 — glass, effects. *Laurent, L. Par. S. Ps. Sé.* (1886) 114-
 — lenses, formula. *Exner, K. A. Ps. C.* 28 (1886) 111-; 29 (1886) 484-
 — liquid, refractive index. *Littlewood, T. H. L. Ps. S. P.* 13 (1895) 74-; *Ph. Mg.* 37 (1894) 467-
 — medium, isotropic, principle of least time. *Boussinesq, J. C. R.* 129 (1899) 905-
 —, —, propagation of parallel limited beam. *Boussinesq, J. C. R.* 129 (1899) 859-
 —, —, wave-propagation. *Boussinesq, J. C. R.* 129 (1899) 794-
 —, —, transparent, movement of light in. *Gergonne, J. D. Gergonne A. Mth.* 19 (1828-29) 257-
 —, —, wave-propagation. *Breton, P.* [1869] (XII) *Isère S. Bil.* 2 (1870) 83-
 Light penetration in Lake of Geneva and Mediterranean. *Forel, F. A. Sch. Nf. Gs. Vh.* (1884-85) 55.

Spectrum Apparatus 3150

SPECTRUM ANALYSIS, APPARATUS FOR.

3150 General.

Cylindrical lenses in spectroscopy. *Schönn, L.* [1871] *A. Ps. C.* 144 (1872) 334-
 Fluor-spar, use in optical instruments. *Thompson, S. P.* [1890] *Ph. Mg.* 31 (1891) 120-
 Graduated arc in spectrum analysis, and distortion of spectrum. *Wilson, J. M. Ph. Mg.* 22 (1861) 364-
 Liquids of great dispersive power, use. *Zenger, C. V. C. R.* 100 (1885) 731-
 Luminous radiations, analysis. *Thirion, J. Rv. Quest. Sc.* 43 (1898) 524-; 44 (1898) 140-, 488-
 Optical notes. *Talbot, W. H. F.* (vi *Adds.*) *Ph. Mg.* 4 (1834) 112-, 289-
 Reflectors in spectroscopy. *Fleck, H. J. Pr. C.* 111 (1871) 352-
 Spectra, bands in, measurement of position. *Sorby, H. C. M. Mer. J.* 14 (1875) 269-
 —, compared, elimination of errors of adjustment for. *Stokes, (Sir) G. R. S. P.* 31 (1881) 470-
 —, graphic method of drawing. *Dodgson, W.* [1876] *Manch. Lt. Ph. S. Mm.* 6 (1879) 20-
 — of metals, new method for mapping. *Crew, H., & Tatnall, R. As. & Asps.* 13 (1894) 741-
 —, —, projection. *Cooke, J. P. Am. J. Sc.* 40 (1865) 243-
 —, —, modification of electric lamp. *Bickerton, A. W. N. Z. I. T.* 7 (1874) 403-
 —, —, objective. *Edelmann, T. D. Nf. Tbl.* (*1872) 114-
 —, —, —, and reversal. *Boudréaux, —.* *Par. S. Ps. Sé.* (1874) 101-
 —, methods of observing and mapping. *Watts, W. M. B. A. Rp.* (1881) 317-
 —, prismatic and diffraction-, projection of Fraunhofer lines. *Draper, J. C. Am. J. Sc.* 9 (1875) 22-
 —, —, method of measuring. *Edser, E., & Butler, C. P. L. Ps. S. P.* 16 (1899) 207-; *Ph. Mg.* 46 (1898) 207-
 —, production and observation. *Prytz, K. Ts. Ps. C.* 29 (1890) 245-
 — by projection. *Janssen, J. Rm. At.* 16 (1862-63) 482-
 —, projection, apparatus for. *Pellin, —.* *Par. S. Ps. Sé.* (1888) 305-
 —, —, best arrangement for. *Maxwell, J. C.* [1868] *Edinb. R. S. P.* 6 (1869) 238-
 —, —, objective. *Bode, P. Frkf. a. M. Ps. Vr. Jbr.* (1891-92) 29-
 —, spark-, of solutions, discharger for. *Dennis, L. M. Am. C. S. J.* 20 (1893) 1-
 Spectrograph with concave mirror. *Ebert, H. Erlang. Ps. Md. S. Sb.* 21 (1890) 1-
 — liquid prism. *Lohse, O. Z. Instk.* 5 (1885) 11-
 Spectrographs, construction and adjustment. *Hartmann, J. Z. Instk.* 20 (1900) 17-, 47-
 —, 2 forms. *Ebert, H. A. Ps. C.* 38 (1889) 489-.

- Spectrographs, quartz, new. *Leiss, C. Z. Instk.* 17 (1897) 321-, 357-.
- , —, and new auxiliary apparatus. *Leiss, C. Z. Instk.* 18 (1898) 325-.
- Spectrophotographs, stars, sun and gases. *Gothard, J.* [1891] *Mag. Tnd. Ak. Ètk. (Termt.)* 21 (1892) No. 2, 31 pp.; *Mth. Nt. B. Ung.* 9 (1892) 67-.
- SPECTROSCOPES.*
- Regnault, V.* [1847] *Science* 5 (*1897) 409-.
- Janssen, J.* *Rm. At.* 16 (1862-63) 73-.
- Littrow, O. von.* *Wien SB.* 47 (*Ab. 2*) (1863) 26-.
- Rexroth, H.* *Fresenius Z.* 3 (1864) 443-.
- Börsch, (Dr.) [A.]* *A. Ps. C.* 129 (1866) 384-.
- Voit, C.* *Carl Rpm.* 1 (1866) 65-.
- Poleck, T.* [1868] *Bresl. Jbr. Schl. Gs.* 46 (1869) 28-.
- Christiansen, C.* *A. Ps. C.* 141 (1870) 470-.
- Young, C. A.* *Franklin I. J.* 60 (1870) 331-.
- Stoney, G. J.* [1871] *Ir. Ac. P.* 1 (1873-74) 208-.
- Zenger, C. W.* *Ph. Mg.* 46 (1873) 439-.
- Vogel, H. W. D. Nf. B.* (*1877) 133.
- Living, G. D.* [1879] *Camb. Ph. S. P.* 3 (1880) 260-.
- Scheiner, J.* *Z. Instk.* 12 (1892) 365-; 14 (1894) 316-.
- Pulfrich, C.* *Z. Instk.* 14 (1894) 354-.
- (Littrow's, improved form.) *Wadsworth, F. L. O. Ph. Mg.* 38 (1894) 137-.
- and applications. *Casares Gil, J.* [1895] *Barcel. Ac. Mm.* 2 (1892-1900) 177-.
- automatic. *Browning, J.* *As. S. M. Not.* 30 (1870) 198-.
- (Browning's). *Proctor, R. A. As. S. M. Not.* 30 (1870) 215-.
- *Grubb, H.* [1870] *As. S. M. Not.* 31 (*1871) 36-.
- *Krüss, H.* [1884-90] *Hamb. Mth. Gs. Mt.* 1 (1889) 112; *Z. Instk.* 5 (1885) 181-, 232-; 10 (1890) 97-; *Hamb. Mth. Gs. Mt.* 2 (1890) (*Festschr., Tl. 2*) 153-.
- , curve traversed by prism. *Proctor, R. A. As. S. M. Not.* 31 (1871) 245-.
- , double. *Proctor, R. A. As. S. M. Not.* 31 (1871) 205-.
- , with fixed telescope. *Krüss, H. Z. Instk.* 8 (1888) 388-.
- , micrometer. *Baily, W. Ph. Mg.* 1 (1876) 314-.
- motion for. *Baily, W. Ph. Mg.* 4 (1877) 100-.
- , with second battery of prisms. *Proctor, R. A. As. S. M. Not.* 31 (1871) 47-.
- binocular, etc. *Stoney, G. J. B. A. Rp.* (1879) 292.
- *Pellin, —.* *As. Fr. C. R.* (1889) (*Pt. 1*) 258-.
- , for faint spectra. *Burton, C. E.* [1874] *Ir. Ac. P.* 2 (1877) 42-.
- collimating eyepiece in. *Dewar, J., & Living, G. D. Camb. Ph. S. P.* 4 (1883) 336-.
- collimator, adjustment. *Schuster, A. L. Ps. S. P.* 3 (1880) 14-; *Ph. Mg.* 7 (1879) 95-.
- , —. *Lippmann, G. C. R.* 129 (1899) 569-.

- comparable scales for spectra. *Weinhold, A. A. Ps. C.* 188 (1869) 417-.
- comparison-, for laboratory use. *Pulfrich, C. Z. Instk.* 18 (1898) 381-.
- of results, possibility. *Gottschalk, F. A. Ps. C.* 121 (1864) 64-.
- construction. *Rutherford, L. M. Am. J. Sc.* 39 (1865) 129-.
- (Rutherford). *Ditscheiner, L. Wien Sb.* 52 (1866) (*Ab. 2*) 563-.
- without deviation, with 1 or 2 prisms, construction. *Radau, R. Carl Rpm.* 2 (1867) 241-.
- diffraction-. *Vogel, H. C. (xii) Z. Instk.* 1 (1881) 20-, 47-.
- , *Olsen, H. Z. Instk.* 18 (1898) 280-.
- , method of observing faint lines. *Hartley, W. N. Dubl. S. Sc. P.* 4 (1885) 206.

Direct Vision Spectroscopes.

- Tait, P. G.* [1871] *Edinb. R. S. P.* 7 (1872) 410-.
- Ricco, A. Spet. It. Mm.* 5 (1876) 117-.
- Thollon, L. C. R.* 86 (1878) 329-, 595-; *Par. S. Ps. Sé.* (1878) 52-.
- Dewar, J., & Living, G. D. R. S. P.* 28 (1879) 482-.
- Ricco, A. Nap. I. Inc. At.* 16 (1879) 243-; *Spet. It. Mm.* 8 (1879) 21-.
- Zenger, K. V. Spet. It. Mm.* 10 (1881) 236-.
- Biese, E. Helsingf. Öfv.* 24 (1882) 30-.
- Living, G. D., & Dewar, J. R. S. P.* 41 (1887) 449-.
- (Curties's.) *Anon. Mer. S. J.* (1899) 337.
- calcite. *Zenger, K. V. C. R.* 93 (1881) 720-.
- double internal reflection. *Herschel, A. S. Intell. Obs.* 7 (1865) 444-.
- high dispersion. *Thollon, L. Par. S. Ps. Sé.* (1879) 27-.
- with liquid prisms. *Zenger, K. V. C. R.* 92 (1881) 1503-; (xii) *Z. Instk.* 1 (1881) 263-.
- powerful. *Zenger, K. V. C. R.* 96 (1883) 1039-.
- (Zenger's). *Goodnow, H. R. Science* 1 (*1883) 601.
- with one prism. *Browning, J. B. A. Rp.* 34 (1864) (*Sec.*) 9.
- — —. *Emsmann, H. A. Ps. C.* 150 (1873) 636-.
- without prism or grating. *Govi, G. Nap. Rd.* 24 (1885) 139-.
- slit or collimator. *Zenger, K. V. Z. Instk.* 6 (1886) 59-.
- with electric illumination. *Gothard, J. [E. von.] Cztg. Opt.* 6 (1885) 1-.
- fixed arm. *Wadsworth, F. L. O. Ph. Mg.* 38 (1894) 337-.
- with fixed deviation. *Goltzsch, H. Carl Rpm.* 18 (1882) 188-.
- — —. *Broca, A., & Pellin, P. As. Fr. C. R.* (1898) (*Pt. 1*) 117.
- — —. *Pellin, P., & Broca, A. Par. S. Ps. Sé.* (1899) 24-.
- half-prism, theory. *Christie, W. H. M. R. S. P.* 26 (1877) 8-.

- of high dispersion. *Cornu, A.* Par. S. Ps. Sé. (1882) 165-.
- imperfections and their remedies. *Ponton, M.* QJ. Sc. 2 (1872) 47-.
- improved. *Cooke, J. P. (jun.)* C. N. 8 (1863) 8.
- *Steinheil, C. A. von.* Münch. Sb. 1 (1863) 47-.
- *Grubb, T. R. S. P.* 22 (1874) 308-.
- *Madan, H. G.* Ph. Mg. 48 (1874) 116.
- (Grubb). *Stokes, (Sir) G. G.* R. S. P. 22 (1874) 309-.
- with inclined slit, image rectified by right-angled prism. *Garbe, P.* Par. S. Ps. Sé. (1883) 59-.
- — — — — *Thollon, L. C. R.* 96 (1883) 642-.
- — — — — (Thollon). *Garbe, P.* C. R. 96 (1883) 836-.
- increasing dispersion in. *Guglielmo, G.* Rm. R. Ac. Linc. Rd. 6 (1890) (Sem. 2) 195-.
- as instruments of precision. *Oppio, L. dall'* Ven. I. At. 1 (1883) 953-.
- intensity of light. *Lippich, F. A.* Ps. C. Beibl. 5 (1881) 585-.
- Ladd's.* *Mascart, É.* [1873] Par. Sé. S. Ps. 1 (1873-74) 93-.
- without lens. *Braham, P. B. A.* Rp. (1889) 544.
- micrometer eyepiece for. *Rood, O. N.* Carl Rpm. 10 (1874) 67-.
- for spectroscopic analysis. *Watts, W. M.* L. Ps. S. P. 1 (1876) 160-; Ph. Mg. 50 (1875) 81-.
- and microspectroscope with telescope. *Marp-mann, G.* Z. Angew. Mkr. 5 (1900) 309-.
- objective. *Merz, S.* Carl Rpm. 6 (1870) 164-.
- optical investigations with special reference to. *Rayleigh, (Lord).* Ph. Mg. 8 (1879) 261-, 403-, 477-; 9 (1880) 40-.
- optics. *Seabroke, G. M.* Nt. 10 (1874) 467-.
- passage of light through. *Hoorweg, J. L.* Utr. Prv. Gn. Aant. (1874) 20-; A. Ps. C. 154 (1875) 423-.
- pocket-. *Simmler, R. T.* Bern Mt. (1863) 62-.
- , measuring scales. *Herschel, A. S.* Nt. 18 (1878) 300-.
- with 11 prisms. *Gassiot, J. P.* R. S. P. 13 (1864) 183-.
- 9 prisms, achromatic telescopes, etc. *Gassiot, J. P.* [1863] (vii) Ph. Mg. 27 (1864) 143-.
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- registering. *Huggins, W.* R. S. P. 9 (1871) 317-.
- with rotating grating. *Lehmann, H.* Z. Instk. 20 (1900) 193-.
- scales. *Chapman, E. J. (xii)* Cn. R. S. P. & T. 1 (1883) (Sect. 3) 55-.
- simple. *Osann, G.* Würzb. Nw. Z. 4 (1863) 1-.
- *Kessler, F.* A. Ps. C. 151 (1874) 507-.
- form for lectures. *Cushman, H.* Science 3 (1896) 45-.
- simplification. *Hüfner, C. G.* Carl Rpm. 15 (1879) 116-.
- slit. *Wadsworth, F. L. O.* Am. J. Sc. 48 (1894) 19-.
- , adjustable, simple form. *Tisley, S. C.* B. A. Rp. (1874) (Sect.) 27.
- , symmetrical, Vierordt's. *Leiss, C.* Z. Instk. 18 (1898) 116-.
- spectroscopic combination, new. *Fievez, C.* Leip. As. Gs. Vjschr. 16 (1881) 311-.
- theory. *Ditscheiner, L.* A. Ps. C. 129 (1866) 336-.
- for ultra-violet. *Cornu, A.* Par. S. Ps. Sé. (1879) 39-.
- uniformity in spectroscopic measurements. *Steinheil, C. A. von.* A. Ps. C. 122 (1864) 167-.
- Spectrum analysis, main points. *Arneberg, A.* Ts. Ps. C. 24 (1885) 321-, 353-; 27 (1888) 65-.
- , bands in, measuring and recording. *Palmer, T. M.* Mer. J. 16 (1876) 277-.
- camera, applications. *Crookes, W.* Pht. S. J. 2 (1856) 292-.
- , conditions for length. *Dolbear, A. E.* Am. Ac. P. 21 (1886) 361-.
- , curvature of lines. *Ditscheiner, L.* Wien Sb. 51 (1865) (Ab. 2) 368-.
- , dispersion-, curvature of lines. *Christie, W. H. M.* As. S. M. Not. 34 (1874) 263-.
- , lines. *Rachinskii, K. A. (xii)* Rec. Mth. (Moscou) 2 (1867) (Pt. 1) 317-.
- , —, feeble, arrangement for measuring. *Vogel, H. C. (xii)* Z. Instk. 1 (1881) 20-, 47-.
- , longitudinal rays. *Babinet, J.* (vi Add.) C. R. 35 (1852) 413-.
- , —, —. *Porro, I.* C. R. 35 (1852) 479-.
- , Newton's method of observation. *Kahlbaum, G. W. A.* Basel Vh. 8 (1890) 884-.
- , photographing whole length at once. *Liveing, G. D.* Camb. Ph. S. P. 9 (1898) 141-.
- , photography, simple apparatus. *Vogel, H. W.* A. Ps. C. 154 (1875) 306-.
- , solar, dark lines, apparatus for observing. *Dujardin, F.* C. R. 8 (1839) 253-.
- , —, fixed lines. *Cooper, J. T.* R. I. J. 2 (1831) 289-.
- , —, longitudinal lines. *Ragona-Scinà, D.* Palomba Rac. 3 (1847) 289-; Pogg. A. 84 (1851) 590-.
- Prism combinations with coincident direct and emergent rays. *Herschel, (Sir) J. F. W.* Les Mondes 3 (1863) 403-.
- , defect of image of interference bands when seen through. *Straubel, R.* A. Ps. C. 66 (1898) 346-.
- , direct vision. *Fuchs, F. (xii)* Z. Instk. 1 (1881) 326-, 349-.
- , —, —. *Braun, K. (xii)* Mth. Term. Éts. 1 (1883) 219-; Mth. Nt. B. Ung. 1 (1882-83) 197-.
- , —, of high dispersion. *Thollon, L.* C. R. 88 (1879) 80-.
- , liquid, for spectroscopy. *Wernicke, K. W.* (xii) Z. Instk. 1 (1881) 353-.

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- Prism of variable angle. *Melander, G.* Helsingf. Öfv. 40 (1898) 32-.
- Prisms, aberrations, effect. *Crova, A.* [1882] Mntp. Ac. Mm. 10 (1884) 265-.
- , carbon disulphide. *Marlow, G.* C. N. 13 (1866) 28.
- , —, use. *Barker, G. F., & Draper, H.* Am. J. Sc. 29 (1885) 269-.
- , —, —, *Smyth, C. P., & Herschel, A. S.* B. A. Rp. (1885) 942-.
- , —, —, *Hasselberg, B.* A. Ps. C. 27 (1886) 415-.
- , dispersion-parallelepiped, construction and applications. *Zenger, K. V.* Prag Sb. (1881) 416-; *As. Fr. C. R.* (1883) 298-.
- , error of train. *Zech, P.* Carl Rpm. 2 (1867) 106-.
- of flint glass and carbon disulphide for spectral analysis. *Rood, O. N.* Silliman J. 35 (1863) 356-.
- , liquid, for spectroscopes, etc. new form. *Hardie, W. M.* [1886] Sc. S. Arts T. 11 (1887) 358-.
- , liquids for. *Hartley, W. N.* Nt. 44 (1891) 273.
- , reflecting, with constant deviation. *Bauernfeind, C. M.* Münch. Sb. (1865) (2) 344-; (1868) (1) 495-.
- , refraction-, new shape. *Cornu, F.* Laus. S. Vd. Bll. 33 (1897) xxxiv-.

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- Quincke, G.* A. Ps. C. 146 (1872) 1-.
- Blake, J. M.* Am. J. Sc. 8 (1874) 33-.
- Thorp, T.* Manch. Mor. S. T. (1894) 26-.
- coefficient of expansion, determination by means of spectrum. *Mendenhall, T. C.* Am. J. Sc. 21 (1881) 230-.

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- Rowland, H. A.* Ph. Mg. 13 (1882) 469-; Am. J. Sc. 26 (1883) 87-.
- diffraction spectra with, experimental arrangement. *Rizzo, G. B.* Tor. Ac. Sc. At. 34 (1898) 794- or 1062-.
- Rowland's.* *Glazebrook, R. T.* L. Ps. S. P. 5 (1884) 243-; Ph. Mg. 15 (1883) 414-; 16 (1883) 377-.
- , *Mascart, É. É. N.* J. de Ps. 2 (1883) 5-.
- , *Waterhouse, (Lt.-Col.) J.* Beng. As. S. P. (1889) 3-.
- , absolute measurements of rulings at 62° F. *Rogers, W. A.* Am. S. Mtr. P. (1885) 151-.
- , astigmatism. *Sirks, J. L.* Amst. Ak. Vh. (Sect. 1) 2 (1894) No. 6, 7 pp.
- , asymmetry in. *Rydberg, J. R.* Stockh. Ak. Hndl. Bh. 18 (Afd. 1) (1893) No. 9, 12 pp.
- , comparison of 2. *Bruère, (Miss) A. H.* Ps. Rv. 3 (1896) 301-.
- , mode of erection. *Haga, H.* A. Ps. C. 57 (1896) 389-.

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- Rowland's,* spectrum photography with. *Waterhouse, (Lt.-Col.) J.* Spet. It. Mm. 18 (1890) 14-.
- spectra. *Baily, W. L.* Ps. S. P. 5 (1884) 181-; Ph. Mg. 15 (1883) 183-.
- in stellar photography. *Poor, C. L., & Mitchell, S. A.* J. H. Un. Cir. [17 (1897-98)] 61-.
- theorem. *Baily, W. L.* Ps. S. P. 8 (1887) 53-; Ph. Mg. 22 (1886) 47-.
- theory. *Sokolov, A. P.* (xn) Rs. Ps.-C. S. J. 15 (Ps., Pt. 1) (1883) 293-.
- , *Mitchell, S. A.* J. H. Un. Cir. [17 (1897-98)] 56-.
- , adjustments and use. *Ames, J. S.* J. H. Un. Cir. 8 (1888-89) 69-.

- echelon film. *Butler, C. P.* Nt. 61 (1899-1900) 275.
- films, with application to colour photography. *Thorp, T.* Manch. Lt. Ph. S. Mm. & P. 44 (1900) No. 12, 8 pp.
- large, machine for ruling. *Mallock, A. B. A.* Rp. (1882) 466-.
- manufacture and theory. *Rayleigh, (Lord).* Ph. Mg. 47 (1874) 81-, 193-; 11 (1881) 196-.
- , —, *Rowland, H. A.* Ph. Mg. 13 (1882) 469-.
- on metal, photography. *Izarn, —.* C. R. 116 (1893) 794-.
- photographic reproduction. *Rayleigh, (Lord).* R. S. P. 20 (1872) 414-; B. A. Rp. 42 (1872) (Sect.) 39-.
- , —, *Izarn, —.* C. R. 116 (1893) 506-.
- , —, *Rayleigh, (Lord).* Nt. 54 (1896) 332-.
- plane, formulæ. *Branly, E. J.* de Ps. 5 (1886) 73-.
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- Blood, apparatus for spectroscopic analysis. *Hénocque, A.* Par. S. Bl. Mm. 38 (1886) (C.R.) 445-; Par. S. Ps. S6. (1887) 83-.
- , etc., spectrocoulometer for. *Arsonval, — d'.* Par. S. Ps. S6. (1890) 109.
- , spectroscopes for detection of (hémato-spectroscopes). *Thierry, M. de.* C. R. 100 (1885) 1244-; 120 (1895) 775-.
- Bolometer, iron-wire, for investigation of heat-spectra. *Edelmann, M. T.* Elekttech. Z. 15 (1894) 81-.
- Bolometric arrangements. Absorption of long wave radiation by carbon dioxide. *Kurlbaum, F. A.* Ps. C. 61 (1897) 417-.
- investigations in grating spectra. *Paschen, F. A.* Ps. C. 48 (1893) 272-.
- Double prism arrangement for viewing sun by light of any desired wave-length. *Harkness, —.* Smiths. Misc. Col. 33 (1888) Art. 4, 13 (bis)-. (Wash. Ph. S. Bll. 10 (1888).)

3165 Spectroscopes

- Gases and vapours of sun, comparison of apparatus and methods employed in study. *Deslandres, H.* Spet. It. Mm. 23 (1895) 141 (bis)-.
- Interference, spectral, lecture experiments. *Lommel, E. von.* Münch. Ak. Sb. 23 (1894) 133-.
- , spectroscopy by. *Perot, A., & Fabry, C.* C. R. 126 (1898) 34-, 331-, 407-.
- in spectroscopy, theory, and applications of new method. *Fabry, C., & Perot, A. A. C.* 16 (1899) 115-.
- Interferometer, spectral. *Zenker, W.* Z. Instk. 7 (1887) 1-.
- Luminous and chromatic intensities of spectral colours and their mixtures, apparatus for studying. *Parinaud, —.* Par. S. Ps. Sé. (1884) 206-.
- Monochromatic light of desired wave-length, instrument for. *Tutton, A. E.* Z. Kr. 24 (1895) 455-.
- , spectral apparatus for producing. *Wülfing, E. A. N.* Jb. Mn. (Beil.-Bd.) 12 (1899) 343-.
- Photography of short wave-lengths. *Schumann, V.* Wien Ak. Sb. 102 (1893) (Ab. 2a) 415-, 625-.
- Polyoptometer. *Porro, I.* C. R. 35 (1852) 433.
- Spectral apparatus, rotating, for solar observations. *Lohse, O.* (XII) Z. Instk. 1 (1881) 22-.
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- comparison-, for colour technique. *Pulfrich, C.* Z. Instk. 20 (1900) 299-.
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- with divided grating. *Lockyer, J. N.* R. S. P. 39 (1886) 416-.
- echelon. *Mann, C. R.* Science 8 (1898) 208-.
- , *Michelson, A. A.* Asps. J. 8 (1898) 37-.
- (Michelson's). *Butler, C. P.* Nt. 59 (1898-99) 607-.
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- , behaviour of chief lines in mercury spectrum under influence of magnetic field. *Blythwood, (Lord), & Marchant, E. W.* Ph. Mg. 49 (1900) 384-, 503.
- for examination of absorption in considerable thickness of liquids. *Thierry, M. de.* C. R. 101 (1885) 811-.
- — — great thicknesses of liquids. *Thierry, M. de.* C. R. 120 (1895) 775-.
- with fluorescent eye-piece. *Soret, J. L.* As. Fr. C. R. 2 (1873) 197-; A. Ps. G. (Jubil.-Bd.) (1874) 407-; Arch. Sc. Ps. Nt. 57 (1876) 319-.
- for measuring extinction coefficients. *Schottländer, P.* Z. Instk. 9 (1889) 98-.
- with phosphorescent eye-piece. *Lommel, E. C. J.* [1883] Münch. Ak. Sb. 13 (1884) 408-.
- to rationalise spectra. *Gramont, A. de.* C. R. 128 (1899) 1564-.
- reversion-. *Zöllner, F.* Leip. B. 21 (1869) 70-.

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- reversion-, *Zöllner's.* *Faye, H. A. É.* C. R. 69 (1869) 689-.
- rigid, observation of lines of spectrum with varying terrestrial gravity. *Gassiot, J. P.* R. S. P. 14 (1865) 320-; 16 (1868) 6-.
- rotatory polarisation-, with great dispersion. *Tait, P. G.* Nt. 22 (1880) 360-.
- use of birefringent eye-piece in. *Cruls, L.* C. R. 96 (1883) 1293-.
- for watching progress of operations in Bessemer converter, etc. *Zenger, K. V.* C. R. 101 (1885) 1005.

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- Babinet, J.* C. R. 4 (1837) 638-.
- Éval'd, T. T.* [1873] (XII) Rs. C. Ps. S. J. 6 (Ps.) (1874) [Pt. 1] 22-.
- Barber, S. J.* Sc. 4 (1874) 34-.
- Abendroth, W.* Dresden Erdk. Jbr. 15 (1878) (Sb.) 40-.
- Rovelli, C.* Rv. Sc.-Ind. [24 (1892)] 71-.
- Air-mirror, Grey's, and related phenomena. *Schränk, F. von P. von.* Münch. D. (1808) 299-.
- Appearances of sun near horizon. *Maggi, P. G.* Ven. At. 3 (1852) 186-.
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- Clouds, artificial, effect on sunlight. *Kiessling, J. Gött. Nr.* (1884) 226-; Hamb. Nt. Vr. Ab. 8 (1884) No. 5, 8 pp.; Met. Z. 1 (1884) 83, 117-.
- after sunset, luminous phenomenon by total reflection. *Salm Horstmar, W. F.* Pogg. A. 104 (1858) 647-.
- Colour phenomena from solar eclipse observations, U.S.A., July 29, 1878. *Abbe, C.* [U.S.] Chief Sig. Off. A. Rp. (*1880) 834-.
- Darkness in caverns. *Calderon y Arana, S.* Madrid S. H. Nt. A. 7 (1878) (Act.) 56-.
- — — (Tyndall's optical vacuum and propagation of light, experiments). *Calderon y Arana, S.* [1886] Par. S. Gl. Bll. 15 (1887) 36-.
- Diffused light at Havana, chemical action. *Poey, A.* Fr. S. Mét. An. 11 (*1863) Pt. 2, 90-.
- Luminous intensity of sun and sky, relation between. *Majorana, Q.* Rm. R. Ac. Linc. Rd. 9 (1900) (Sem. 2) 87-.
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- , *Soler, E.* *Palermo Ac. At.* 2 (1893) (Sc.-Nt.) 64 pp.
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- Wolf, C.* C. R. 66 (1868) 792-, 1051.
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- and coronæ, formation. *Lovering, J.* *Am. As. P.* 19 (1870) 64-.
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- diffraction-colours. *Dove, H. W.* *Pogg. A.* 26 (1832) 310-.
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- and parhelia, artificial production. *Cornu, A.* *C. R.* 108 (1889) 429-.

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- , —, theory. *Fraunhofer*, J. *Schumacher As. Ab.* 3 (1825) 31-.
- , —, theory. *Galle*, J. G. *Pogg. A.* 49 (1840) 1-, 241-.
- , —, *Cherrill*, A. K. [1891] *Sym. Met. Mg.* 26 (1892) 49-, 69-.
- , —, *Backhouse*, T. W. [1891] *Sym. Met. Mg.* 26 (1892) 86.
- , —, (Backhouse). *Cherrill*, A. K. [1891] *Sym. Met. Mg.* 26 (1892) 101-.
- , —, rings round luminous bodies, explanation; and some optical phenomena. *Moser*, L. *Pogg. A.* 16 (1829) 67-.
- , —, theory. *Lovering*, J. *Am. Ac. P.* 8 (1873) 215-.
- , —, *Cellérier*, C. *Gen. S. Ps. Mm.* 29 (1884-87) No. 9, 73 pp.
- , —, *Ekama*, H. *Mbl. Nt.* (1897) 172-.
- , —, *Nell*, C. A. C. *Mbl. Nt.* (1898) 87-.
- in the zenith and of 90°. *Barber*, S. J. *Sc.* 8 (1878) 140-.

- Iridescence of clouds, cause. *Stoney*, G. J. *Dubl. S. Sc. T.* 3 (1883-87) 637-.
- Iridescent clouds. *Mohn*, H. *Christiania F.* (1893) No. 10, 39 pp.
- , —, phenomena on Lake Windermere. *Miller*, J. F. *Edinb. N. Ph. J.* 55 (1853) 83-.
- Parhelia. *Traill*, W. A. B. A. *B. A. Rp.* 41 (1871) (Sect.) 56.
- , —, *Schuster*, A. *Nt.* 13 (1876) 393-.
- , —, theory. *Cherrill*, A. K. (ix) *Eastbourne NH. S. Pp.* (1873) (Feb.) 3 pp.

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- Tyndall*, J. [1884] *Ph. Mg.* 17 (1884) 61-; *B. I. P.* 10 (1884) 455-; *Ciel et Terre* 5 (1885) 145-.
- Mascart*, —, A. C. 26 (1892) 501-.
- Schweder*, G. *Riga Cor.-Bl.* 37 (1894) 101-.
- Czermak*, P. *Met. Z.* 12 (1895) 308-.
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- , —, —, and elliptically generated rainbows. *Schaw*, (Maj.-Gen.) —, N. Z. I. T. 25 (1893) 450-.
- colours, and white rainbow. *Pernter*, J. M. *Wien Ak. Sb.* 106 (1897) (Ab. 2a) 135-.
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- distance. *Cox*, H. *Mess. Mth.* 11 (1882) 52-.
- formed by liquids with different refractive indices. *Hammerl*, H. [1882] *Wien Ak. Sb.* 68 (1883) (Ab. 2) 206-.
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- observed on Lake of Geneva. *Penard*, —, *Arch. Sc. Ps. Nt.* 6 (1898) 534.
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- , —, *Muncke*, G. W. *Gilbert A.* 23 (1806) 405-.
- , —, (Venturi's theory). *Brandes*, H. W. *Gilbert A.* 52 (1816) 385-.
- , —, *Miller*, W. H. *Camb. Ph. S. T.* 7 (1842) 277-.
- , —, *Burton*, P. [1878] *Ir. Ac. P.* 3 (1883) 186-.
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- , —, *Mascart*, É. C. R. 106 (1888) 1575-.
- , —, (Miller). *Larmor*, J. *Camb. Ph. S. P.* 6 (1889) 281-.
- , —, appearance. *Mossotti*, O. F. (vi *Adds.*) *II Cim.* 4 (1846) 97-.
- , —, caused by interference. *Pratt*, (Archd.) *J. H. Ph. Mg.* 5 (1853) 78-.
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- , —, *Potter*, R. [1835] *Camb. Ph. S. T.* 6 (1838) 141-.
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- , —, *Grunert*, J. A. *Grunert Met. Opt.* 1 (1848) 1-.
- , —, *Potter*, R. *Ph. Mg.* 9 (1855) 321-.

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 —, experimental illustration. *Pulfrich*, C. Bonn. Niedr. Gs. Sb. (1887) 158-; D. Nf. Tbl. (1887) 238; A. Ps. C. 33 (1888) 194-
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- Rings, Bishop's, theory. *Pernter*, J. M. Met. Z. 6 (1889) 401-
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- Rayleigh*, (Lord). [1870] Ph. Mg. 41 (1871) 107-, 274-
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Pickering, W. H. Science 6 (1885) 316.
Wyss, G. H. von. Zür. Vjschr. 33 (1888) 279-
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 —. *Collas*, C. Les Mondes 29 (1872) 617-
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- Blue colour. *Spring*, W. Brux. Ac. Bil. 36 (1898) 504-; Ciel et Terre 19 (1898-99) 587-
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 — (Spring). *Pernter*, J. M. [1899] Ciel et Terre 20 (1899-1900) 301-
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 — — —. *Aitken*, J. Edinb. R. S. P. 12 (1884) 448-, 647-
 — — —. *Flammarion*, C. As. (1884) 19-, 58-
 — — —. *Meidinger*, —. [1884] Karlsruhe Nt. Vr. Vh. 10 (1888) (Sb.) 24-
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 — tints, theory. *Lommel*, E. von. Münch. Ak. Ab. 19 (1899) 449-, 735-
 Unusual colorations, historical account. *Kiessling*, J. Hamb. Nt. Vr. Ab. 10 (1887) No. 3, 19 pp.

POLARISATION.

- Brewster, (Sir) D.* [1863] *Edinb. R. S. T.* 23 (1864) 211-.
- Rubenson, R.* [1864] *Ups. N. Acta S. Sc.* 5 (1865) 1-, i-.
- Brewster, (Sir) D.* [1866] *Edinb. R. S. T.* 24 (1867) 247-.
- Tyndall, J.* *R. S. P.* 17 (1869) 223-.
- Rayleigh, (Lord).* [1870] *Ph. Mg.* 41 (1871) 107-, 274-.
- Lallemand, A.* *C. R.* 75 (1872) 707-.
- Bosanquet, R. H. M.* *Ph. Mg.* 50 (1875) 497-.
- Soret, J. L.* *Sch. Nf. Gs. Vh.* 60 (1876-77) 54-.
- Busch, F.* *Met. Z.* 3 (1886) 532-.
- Soret, J. L.* *A. C.* 14 (1888) 503-.
- Basso, G.* *It. S. Met. An.* 4 (1889) 238-.
- McConnel, J. C.* *Ph. Mg.* 27 (1889) 81-.
- Hurion, A.* *C. R.* 116 (1893) 795-.
- by air mixed with aqueous vapour. *Haidinger, W. von.* *Ph. Mg.* 38 (1869) 54-.
- of different colours. *Piltchikoff, N. C. R.* 115 (1892) 555-.
- experiments. *Rosenbach, —.* *Bresl. Schl. Gs. Jbr.* (1893) (*Ab. 2a*) 17-.
- *Hintze, —.* *Bresl. Schl. Gs. Jbr.* (1893) (*Ab. 2a*) 19-.
- floating matter and light. *Tyndall, J.* *Nt.* 1 (1870) 499-.
- influence of Earth's magnetism. *Becquerel, H. C. R.* 86 (1878) 1075-; 87 (1878) 1035; 89 (1879) 838-; *A. C.* 19 (1880) 90-; *C. R.* 93 (1881) 481-; *A. C.* 27 (1882) 312-.
- of light reflected by air. *Delezenne, —.* *Lille Tr.* (1823-24) 34-.
- — — — *Quetelet, L. A. J.* *Quetelet Cor. Mth.* 1 (1825) 275-.
- — — — or water. *Hagenbach, E.* [1870-71] *Arch. Sc. Ps. Nt.* 37 (1870) 176-; *Basel Vh.* 5 (1873) 503-.
- — — — *Soret, J. L.* *Arch. Sc. Ps. Nt.* 37 (1870) 180-; 39 (1870) 352-.
- moonlight. *Piltchikoff, N. C. R.* 114 (1892) 468-.
- and sunlight. *Zantedeschi, F.* *Rm. Bll. Met.* 4 (1865) 51-.
- neutral point, Brewster's. *Soret, J. L., & Soret, C.* [1888] *C. R.* 107 (1888) 621-; *Arch. Sc. Ps. Nt.* 21 (1889) 28-.
- points, Brewster's, Arago's and Babinet's, comparative visibility. *Chase, P. E.* *Ph. Mg.* 32 (1866) 156-.
- observations with the new polarimeter of Rubenson. *Thalén, T. R.* *Stockh. Öfv.* 19 (1862) 29-.
- observed under tropical sky of Havana. *Poey, A. C. R.* 60 (1865) 781-.
- polar clock. *Wheatstone, (Sir) C. B. A. Rp.* (1848) (*pt. 2*) 10-.

3240 Atmospheric Absorption.

(See also 3850; Astronomy 5400.)

- Langley, S. P.* *Am. J. Sc.* 28 (1884) 163-.
- Absorption by atmospheric carbon dioxide and water vapour. *Ångström, K. A.* *Ps.* 3 (1900) 720-.

- Absorption of calorific rays by Earth's atmosphere. *Melloni, M. C. R.* 10 (1840) 18.
- — — heat by layers of air of different thickness. *Magmus, G.* *Berl. Mb.* (1862) 569-.
- — — moist air. *Magmus, G.* *Berl. Mb.* (1862) 572-.
- — solar radiation by atmosphere, empirical formula for. *Bartoli, A., & Stracciati, E.* *N. Cim.* 31 (1892) 193-.
- — — — clouds. *Bartoli, A., & Stracciati, E.* *Mil. I. Lomb. Rd.* 27 (1894) 592-.
- Atmospheric absorption and electric light. *Adams, W. G.* *Elect.* 15 (1885) 362-, 381-.
- — — estimation. *Cornu, A. C. R.* 95 (1882) 801-.
- — of heat-rays, according to experiments made at Amsterdam. *Stamkart, F. J.* *Amst. N. Vh.* 13 (1848) 27-.
- — — Himalayas. *Schuster, A.* *Nt.* 13 (1876) 393-.
- — in infra-red. *Abney, (Capt.) W. de W., & Festing, (Col.) —.* *R. S. P.* 35 (1883) 80-.
- — of light. *Hausdorff, F.* *Leip. Mth. Ps.* B. 47 (1895) 401-.
- — — — *Ricco, A.* *Catania Ac. Gioen. Bll.* 53-54 (1898) 2-.
- — — photographic rays. *Schaeberle, J. M.* *Lick Obs. Ct.* 3 (1893) 89 pp.
- — — ultra-violet radiation. *Cornu, A. C. R.* 88 (1879) 1285-; 90 (1880) 940-; *As. Fr. C. R.* (1884) (*Pt. 2*) 103-.
- Balloon ascents, spectroscopic observations. *Fonvielle, W. de.* *C. R.* 79 (1874) 816-.
- Calorific effects of sun at extremities of Earth's atmosphere. *Saigey, J. F.* *Mon. Sc.* 13 (1871) 257-.
- Chiaroscuro and optical phenomenon. *Maggi, P. G.* *Verona Mm. Ac.* Ag. 20 (1842) 53-.
- Constituent of atmosphere absorbing radiant heat. *Hill, S. A.* *R. S. P.* 33 (1882) 216-, 435-.
- Extinction of light in atmosphere. *Jacob, W. S.* *Edinb. R. S. P.* 2 (1851) 271-.
- — — — (Jacob). *Meech, L. W.* *Am. As. P.* (1858) 42-.
- — — — *Seeliger, H.* *Münch. Ak. Sb.* 21 (1892) 247-.
- — — — influence of selective absorption. *Hepperger, J. von.* *Wien Ak. Sb.* 105 (1896) (*Ab. 2a*) 173-.
- Lighthouses and search lights, failure of electric arcs in fog. *Paul, H. M.* *Science* 5 (1885) 150-.
- Radiant and absorptive properties of vapour in atmosphere. Tyndall's deductions. *Russell, R. B. A. Rp.* (*1867) (*Sect.*) 11-.
- Radiation through Earth's atmosphere. *Tyndall, J.* *Ph. Mg.* 25 (1863) 200-.
- Red glass, effect in rendering objects more visible through mist. *Luvini, J.* *L'I.* 17 (1849) 8.
- Solar light, change in passing through atmosphere. *Hassenfratz, J. H. A. C.* 66 (1808) 54-.
- — — — — (Hassenfratz). *Haily, R. J.* *J. de Ps.* 66 (1808) 356-.
- — — chemical intensity at different altitudes of sun. *Baxendell, J., & Roscoe, H. E.* [1866] *R. S. P.* 15 (1867) 20-.

3260 Energy of Sun-light

- Solar light, chemical intensity at different altitudes of sun (Baxendell and Roscoe). *Clausius, R.* Ph. Mg. 32 (1866) 41-.
- , curious effect. *Percival, J. G.* Silliman J. 12 (1827) 164-.
- , diminution of intensity in atmosphere. *Forbes, J. D.* Edinb. R. S. P. 1 (1845) 55-.
- , transmission through Earth's atmosphere. *Abney, (Capt.) W. de W.* [1888-92] Phil. Trans. (A) 178 (1888) 251-; 184 (1894) 1-.
- radiation, influence of water in atmosphere. *Abney, (Capt.) W. de W., & Festing, (Col.)* —. R. S. P. 35 (1888) 328-.
- Spectrum analysis and rain-band. *Jameson, H. G.* [1888] Eastbourne NH. S. T. 2 (1886-94) 62-.
- of atmosphere and that of water vapour. *Janssen, J. B. A.* Rp. 36 (1866) (Sect.) 11.
- Transparency of atmosphere and flames. *Allard, E. C. R.* 81 (1875) 1096-; Par. Mm. Sav. Étr. 25 (1877) No. 2, 48 pp.
- — — (Allard). *Bequerel, A. C.* C. R. 82 (1876) 1300-.
- —, instrument to measure (diaphanometer). *Saussure, H. B.* Turin Mm. Ac. 4 (1788-89) 425-.
- — and law of extinction of solar rays in passing through it. *Forbes, J. D.* Phil. Trans. (1842) 225-.
- —, photometer for. *Delarive, A. C. R.* 64 (1867) 1221-.
- —, probabilities applied to variations in. *Seidel, L.* Münch. Sb. 2 (1863) 320-.
- — and vision of distant objects. *Meidinger, H.* Karlsruhe Nt. Vr. Vh. 11 (1891) (Ab.) 360-.

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(See also Astronomy 4200; Meteorology 0930.)

- Actinometric measurements of solar heat on Alps. *Rizzo, G. B.* Spet. It. Mm. 26 (1898) 79-; N. Cim. 7 (1898) 120-; Spet. It. Mm. 27 (1899) 10-.
- — — — Mt. Whitney. *Langley, S. P.* U. S. Sig. Serv. Pp. No. 15 (1884) 242 pp.
- observations, accuracy obtainable in. *Saveljev, R. N.* Rs. Ps.-C. S. J. 25 (Ps.) (1893) 1-; A. C. 28 (1893) 394-; 29 (1893) 260-.
- — — (Saveljev). *Wild, H. A. C.* 29 (1893) 283-.
- — — — (—). *Chvolson, O.* A. C. 30 (1893) 141-.
- — — — *Saveljev, R. N.* A. C. 4 (1895) 424-.
- — on Mt. Blanc, 1887. *Vallot, J.* Mt. Blanc Obs. A. 2 (1896) 77-.
- — — — during partial solar eclipse. *Vallot, J., & Vallot, (Mme.) G.* Mt. Blanc Obs. A. 2 (1896) 71-.
- Actinometry. *Radaw, R.* Mon. Sc. 19 (1877) 524-, 563-.
- , *Frölich, O.* [1883-87] Elekttech. Z. 5 (1884) 3-; A. Ps. C. 21 (1884) 1-; Wien Met. Z. 19 (1884) 209-; Met. Z. 1 (1884) 247-; A. Ps. C. 30 (1887) 582-.

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- Actinometry, chemical, at different heights and temperatures. *Vallot, J., & Vallot, (Mme.) G.* Mt. Blanc Obs. A. 3 (1898) 81-.
- , Langley's measurement. *Maurer, J. Z.* Instk. 6 (1886) 237-.
- , slow, process. *Downes, A. C. N.* 42 (1880) 178.
- , use of ice calorimeter. *Michelson, V. A.* Rs. Ps.-C. S. J. 26 (Ps.) (1894) 1-; J. de Ps. 4 (1895) 578-.
- Atmospheric pressure, influence on chemical action of direct sunlight. *Andresen, M.* Mt. Blanc Obs. A. 4 (1900) 1-.
- Solar energy, conservation. *Siemens, (Sir) C. W.* Franklin I. J. 84 (1882) 57-.
- — — (Siemens). *Archibald, E. D.* Nt. 25 (1882) 504.
- — — (Archibald, Morris, Hunt and Fitz Gerald). *Siemens, (Sir) C. W.* Nt. 25 (1882) 504-, 603; 26 (1882) 80.
- — — (Siemens). *Morris, C.* Nt. 25 (1882) 601-.
- — — (—). *Hunt, T. S.* Nt. 25 (1882) 602-.
- — — (—). *FitzGerald, G. F.* Nt. 26 (1882) 80.
- — — (—). *Faye, H. A. É.* C. R. 95 (1882) 612-.
- — — (Faye). *Siemens, (Sir) C. W.* C. R. 95 (1882) 769-.
- — — (Siemens). *Hirn, G. A.* C. R. 95 (1882) 812-.
- — — (Hirn). *Siemens, (Sir) C. W.* C. R. 95 (1882) 1037-.
- — — *Faye, H. A. É.* C. R. 95 (1882) 1110-.
- — — (Siemens). *Hirn, G. A.* C. R. 95 (1882) 1195-.
- — — *Tommasi, D.* Les Mondes 3 (1882) 500-.
- — — (regenerative theory). *Cook, E. H.* Ph. Mg. 15 (1883) 400-.
- — — (Cook). *Siemens, (Sir) C. W.* Ph. Mg. 16 (1883) 62-.
- — — (Faye and Hirn). *Siemens, (Sir) C. W.* C. R. 96 (1883) 43-.
- physics, questions. *Siemens, (Sir) C. W.* [1883] R. I. P. 10 (1884) 315-.
- Sun, does Earth receive any direct heat from? *Howorth, H. H.* Manch. Lt. Ph. S. P. 13 (1874) 181-.
- Sun's temperature. *Le Chatelier, H. C. R.* 114 (1892) 737-, 864.

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3400 General.

(See also 2990.)

- Displacements, continuous, of particles of medium, formulæ connected with. *Tait, P. G.* Edinb. R. S. P. 4 (1862) 617-.
- Fourier's double integrals, application to optical problems. *Godfrey, C.* [1899] Phil. Trans. (A) 195 (1901) 329-.
- Heat, light and colours. *Blackburne, W.* Tilloch Ph. Mg. 6 (1800) 334-.

- Heat, light and electricity, wave theories. *Hudson, H.* Ph. Mg. 44 (1872) 210-.
- and light, new theory. *Franklin, B.* [1788] Am. Ph. S. T. 3 (1793) 5-.
- —, propagation, theory. *Cauchy, A. L.* C. R. 9 (1839) 283-.
- , light and sound compared. *Clausius, R.* Zür. Mschr. 2 (1857) 73-.
- and light, vibration theory. *Ampère, A. M.* A. C. 58 (1835) 432-.
- — waves, action on movable bodies. *Puschl, K.* Wien SB. 15 (1855) 279-.
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- , —. *Babinet, J.* C. R. 63 (1866) 581-, 662-.

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- action. *Kastner, K. W. G.* D. Nf. Vsm. B. (1842) 25-.
- apparently monochromatic, analysis by Newton's rings. *Carvalho, E.* C. R. 130 (1900) 496-.
- attraction and repulsion. *Recamier, —.* C. R. 31 (1850) 851-.
- and elasticity, theory. *Barré de Saint-Venant, —.* L'I. 24 (1856) 32-.
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- mathematical development of laws. *Buquoy, G. von.* Oken Isis (1824) 728-.
- monochromatic, as damped vibrations. *Rovida, A.* Rv. Sc. [Ind.] 30 (1898) 225-.
- motion in transparent media. *La Place, P. S.* (marquis) de. [1808] Par. Mm. de l'I. (1809) 300-.
- propagation. *Müller, J. J.* [1871] A. Ps. C. 145 (1872) 86-.
- , *Gouy, A.* C. R. 91 (1880) 877-.
- , and chemical composition, relations between. *Schrauf, A.* Pogg. A. 118 (1863) 559-; 119 (1863) 461-, 553-.
- , — density and composition of the medium, relation between. *Lorentz, H. A.* Amst. Ak. Vh. 18 (1879) 112 pp.; A. Ps. C. 9 (1880) 641-.
- , dependence on density. *Schrauf, A.* Pogg. A. 116 (1862) 192-.
- in isophanous media. *Cauchy, A. L.* C. R. 30 (1850) 33-.
- isotropic media. *Rubenson, R.* Stockh. Öfr. (1884) No. 10, 3-; Fsch. Ps. (1885) (Ab. 2) 7-.
- , lateral, or parageny. *Babinet, J.* Cosmos 25 (1864) 393-, 421-.
- , law. *Poynting, J. H., & Love, E. F. J.* [1886-88] Birm. Ph. S. P. 5 (1885-87) 354-; 6 (1887-89) 168.
- in media at rest and in motion, new theory. *Sagnac, G.* C. R. 129 (1899) 756-, 818-; Par. S. Ps. Sé. (1899) 162-.
- propagation in water and transparent bodies. *Maistre, X. de.* Bb. Un. 57 (1834) 200-.
- property of repulsive forces acting upon. *Malus, É. L.* Arcueil Mm. Ps. 2 (1809) 254-.
- radiation, theory. *Kirchhoff, G.* Berl. Ak. Sb. (1882) 641-.
- recent views. *Witkowski, A.* Kosmos (Lw.) 12 (1887) 71-.
- solar, mechanical energy of cubic mile; and possible density of luminiferous medium. *Thomson, (Sir) W.* [1854] C. R. 39 (1854) 529-; Edinb. R. S. T. 21 (1857) 57-.
- , number of primitive calorific rays. *Young, M.* [1798] Ir. Ac. T. 7 (1800) 119-.
- 2 theories, new critical point of conflict. *Bretton, P.* [1872] (xii) Isère S. Bll. 4 (1875) 236-, 237-.
- unpolarised, instrument for exhibiting mode of vibration. *Snell, E. S.* Am. As. P. (1850) 277-.
- velocity and aberration, historical note. *Liagre, J.* Brux. Ac. Bll. 13 (1862) 10-.
- , regarded as velocity of matter. *Preston, S. T.* Elect. 27 (1891) 576-.
- , and size of molecules of medium, relation between. *Joubin, P.* C. R. 115 (1892) 1061-, 1346.
- vibrations of common light. *Tait, P. G.* Edinb. R. S. P. 11 (1882) 418-.
- , law observed in. *Biot, J. B.* Arcueil Mm. Ps. 3 (1817) 132-.
- , regularity. *Gouy, —.* C. R. 120 (1895) 915-.
- wave propagation, anomalous. *Zeeman, P.* Ps. Z. 1 (1900) 542-.
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- wave-length, supposed dependence on intensity. *Lippich, F.* [1875] Wien Ak. Sb. 72 (1876) (Ab. 2) 355-.
- of different wave-lengths, velocity in vacuo. *Décombe, L.* C. R. 128 (1899) 172-.
- waves, attraction, proofs of phenomenon discovered by Guthrie and Schellbach. *Nieuwenhuijzen Kruseman, J.* Utr. Prv. Gn. Aant. (1875) 36-.
- , 3 kinds, corresponding to simple movements of the ether. *Cauchy, A. L.* C. R. 27 (1848) 621-.
- , motion, Wheatstone's apparatus to illustrate. *Secchi, A.* Rm. Cor. Sc. 2 (1853) 183-.
- , passage through focus. *Joubin, P.* C. R. 115 (1892) 932-.
- , spherical and cylindrical. *Julius, V. A.* Arch. Nérl. 28 (1895) 226-.
- white, form of vibrations in. *Carvalho, E.* C. R. 130 (1900) 79-, 130-; J. de Ps. 9 (1900) 138-.
- , —, —. *Gouy, —.* C. R. 130 (1900) 241-.
- , —, —. *Carvalho, E.* C. R. 130 (1900) 401-.
- , —, —; Fourier's series. *Gouy, —.* C. R. 130 (1900) 560-.

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 —, —, —, —, —. (Joubin). *Cornu, A. C. R. 116 (1893) 711.*
 —, —, —, —, —. *Joubin, P. C. R. 116 (1893) 872.*

Optics, part of a course. *Duhem, P. Brux. S. Sc. A. 18 (1894) (Pt. 2) 95-; 19 (1895) (Pt. 2) 27-; 20 (1896) (Pt. 2) 27-.*

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Radiations, solar, why most refrangible do not produce light. *Kessler, G. Arch. f. Oph. 1 (1854) 466-.*

Rotating bodies, optical phenomena. *Kurz, A. A. Ps. C. (Ergänz.) 5 (1871) 653-.*

Transparency of the ether. *Brace, De W. B. [1888] Nebr. Un. Stud. 1 (1888-92) 1-.*

Vibration, influence of motion of source on intensity of vibrations emitted. *Mees, R. A. Amst. Ak. Vs. M. 9 (1876) 243-; Arch. Néerl. 12 (1877) 1-.*

— intensity of wavelets diverging from every point of plane wave. *Smith, Arch. [Signed H. T.] Camb. Mth. J. 3 (1841) 46-.*

Vibrations of the ether in media isophanous with reference to given direction. *Cauchy, A. L. C. R. 30 (1850) 93-.*

— — — — — medium or system of 2 media. *Cauchy, A. L. C. R. 7 (1838) 751-.*

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— propagation (theorem of Gergonne). *Lévisal, A. J. de Ps. 2 (1873) 207-.*

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— —, Fresnel's laws, deduction from mechanical theory. *Haughton, S. Ir. Ac. P. 4 (1850) 455-.*

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—, plane, in elastic media. *Haughton, S. [1849] Ir. Ac. T. 22 (1855) 97-.*

—, —, 2 kinds in isotropic system of material points. *Cauchy, A. L. C. R. 10 (1840) 905-.*

— —, propagation in system of molecules. *Cauchy, A. L. C. R. 7 (1838) 865-.*

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— — — — — (Thomsen's experiments). *Tumliarz, O. Wien Ak. Sb. 97 (1889) (Ab. 2a) 1627-; 98 (1890) (Ab. 2a) 826-, 1121-.*

— — — — — *Ravenshear, A. F. Elect. Rv. 36 (1895) 470.*

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— — — — — *Goldhammer, D. [1900] Kazan S. Ps.-Mth. Bil. 10 (1901) 231-; Arch. Néerl. 5 (1900) 467-.*

— — — — — *Maxwell-Bartoli's. Lebedev, P. Rs. Ps.-C. S. J. 32 (Ps.) (1900) 211-; Sc. Abs. 4 (1901) 485.*

— —, and motion of the ether. *Lodge, O. Ph. Mg. 46 (1898) 414-.*

— —, showing apparent failure of electromagnetic equations. *Rayleigh, (Lord). Ph. Mg. 45 (1898) 522-.*

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Parrot, G. F. Gilbert A. 51 (1815) 292-.

Fechner, G. T. Kastner Arch. Ntl. 12 (1827) 22-.

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Richter, E. Anhalt Vh. Nt. Vr. 1 (1840-42) 18-.

Fizeau, H. L. C. R. 29 (1849) 90-.

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(— — —, Foucault's.) *Emery, L. [1863] Laus. Bil. S. Vd. 7 (1864) 389-.*

(— — —, —) *Moberg, A. [1863] (viii) Helsingf. Öfv. 6 (1864) 2-.*

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3405 Radiation-pressure. Mechanical Equivalent of Light.

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- (Error in Cornu's determination.) *Helmert, F.* R. As. Nr. 87 (1876) 123-.
- Michelson, A. A.* Nt. 18 (1878) 195; Am. As. P. (1878) 71-; (1879) 124-.
- Cornu, A.* C. R. 91 (1880) 1019-.
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- Cornu, A. C. R.* 92 (1881) 53-.
- Rayleigh, (Lord).* Nt. 24 (1881) 382-; 25 (1882) 52.
- Gouy, A. C. R.* 94 (1882) 1296-.
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- (Revolving mirror method, Foucault's, improvements in apparatus.) *Wolf, C. C. R.* 100 (1885) 303-.
- (— — —, theory.) *Gouy, —.* C. R. 101 (1885) 502-.
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- (— — —, —.) *Gibbs, J. W.* Nt. 33 (1886) 582.
- Gouy, —.* A. C. 16 (1889) 262-.
- Jaumann, G.* Wien Ak. Sb. 100 (1891) (*Ab.* 2a) 1239-.
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- Ristenpart, —.* [1894] Karlsruhe Nt. Vr. Vh. 11 (1896) (*Sb.*) 265-.
- Kaiser, —.* Nass. Vr. Jb. 51 (1898) xxxii.
- Cornu, A.* [1900] Sc. Abs. 4 (1901) 360-.
- Perrotin, —.* C. R. 131 (1900) 731-.
- Finite velocity, Roemer's discovery. *Wernicke, A. Z. Mth. Ps.* 25 (1880) (*H.-lt. Ab.*) 1-.
- Historical note. *Erlor, W.* Pogg. A. 88 (1853) 538-.
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- Velocity in air and water. *Breguet, L., & Fizeau, H. C. R.* 30 (1850) 562-, 771-.
- — — — —. *Foucault, L. A. C.* 41 (1854) 129-.
- — — carbon disulphide. *Gouy, —.* C. R. 103 (1886) 244-.
- — — — —, of red and blue light. *Michelson, A. A. B. A. Rp.* (1884) 654.
- — — crystals. *Kohlrausch, W. F.* [1878-79] A. Ps. C. 6 (1879) 86-; 7 (1879) 427-.
- — — elements, and their crystalline form. *Zenger, C. W. C. R.* 75 (1872) 670-.
- — — glass, effects of heat. *Fizeau, H. L. C. R.* 54 (1862) 1237-; A. C. 66 (1862) 429-.
- — — and Kirkwood's analogy. *Chase, P. E. Am. Ph. S. P.* 18 (1880) 425-.
- — — in magnetic field. *Morley, E. W., & Eddy, H. T. Am. As. P.* (1890) 81-.
- — — different media. *Abria, —.* Moigno Cosmos 17 (1860) 261-.
- — — metals. *Grönberg, T.* Riga Cor.-Bl. 33 (1890) 5-.
- — — quartz. *Lang, V. von.* [1869] Wien Ak. Sb. 60 (1870) (*Ab.* 2) 767-.
- — — plates. *Hallock, W. A. Ps. C.* 12 (1881) 147-.
- — — of radiant heat. *Wrede, F. J. Pogg. A.* 53 (1841) 602-.
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- Tilloch Ph. Mg.* 19 (1804) 309-.
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- — — — —. *Potter, R. Ph. Mg.* 3 (1833) 333-.
- — — water, change produced by heat. *Rühlmann, R. A. Ps. C.* 132 (1867) 1-, 177-.
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- of white and coloured light. *Forbes, G., & Young, J.* [1881] Phil. Trans. 173 (1883) 231-.
- — — — — in air, water, and carbon disulphide. *Michelson, A. A.* Wash. As. Pp. for Ephem. & Naut. Alm. 2 (1891) 231-.
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- Babinet, J. C. R.* 9 (1839) 774-.
- Stokes, G. G. Ph. Mg.* 27 (1845) 9-; 29 (1846) 62-.
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- (*Fresnel's theory.*) *Stokes, G. G. Ph. Mg.* 28 (1846) 76-.
- (*Stokes.*) *Challis, J. Ph. Mg.* 28 (1846) 90-.
- Challis, J. Ph. Mg.* 28 (1846) 176-, 393-.
- Powell, B.* [1846-47] *Ashmol. S. P.* 2 (1843-52) 136-; *Ph. Mg.* 29 (1846) 425-; (vi *Adds.*) 30 (1847) 93-.
- Beer, A. Pogg. A.* 93 (1854) 213-.
- Challis, J. Ph. Mg.* 9 (1855) 430-.
- (*Theory.*) *Eisenlohr, F. Heidl. Vh. Nt. Md.* 3 (1865) 190-.
- Willigen, V. S. M. van der. Harl. Arch. Ms.* Teyl. 1 (1868) 364-.
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- (*Theory.*) *Challis, J. Ph. Mg.* 43 (1872) 289-.
- Despeyroux, C. Toul. Mm. Ac.* 4 (1872) 232-.
- Schouten, G. N. Arch. Wisk.* 1 (*1875) 199-.
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- — — constitution of luminiferous ether. *Stokes, G. G. Ph. Mg.* 29 (1846) 6-.

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- Earth, influence on diffraction. *Willigen*,
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- — — *Babinet*, J. *C. R.* 55
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- — — *Lorentz*, H. A. *Amst.*
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- — — propagation in doubly
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- the ether near Earth. *Lodge*, O. [1892-
93] *R. I. P.* 13 (1893) 565-; *Phil. Trans.*
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- (Coloured light of double stars.) *Doppler*, C.
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- — — radiation energy. *Guillaume*, C. É.
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- (Rink). *Hoorweg*, J. L. (xii) *Mbl. Nt.*
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- *Zenker*, W. *As. Nr.* 85 (1875) 151-.
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- Drift, consequences of Fresnel's law. *Potier*,
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- Ether, behaviour towards movement of Earth.
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- — — *Michelson*, A. A., & *Morley*,
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- — — *Lorentz*, H. A. *Amst. Ak.*
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- , —, experiment. *Luvini, G.* Tor. Ac. Sc. At. 10 (1874-75) 517-.
- , —, —, *Mie, G. D. Nf. Vh.* (1900) (*Th.* 2, *Hälfte* 1) 26-.
- , —, and pressure of radiation. *Lodge, O.* Ph. Mg. 46 (1898) 414-.
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- , —, —, —, and media at rest, new theory. *Sagnac, G.* C. R. 129 (1899) 756-, 818-; Par. S. Ps. Sé. (1899) 162-.
- Reflection of light, influence of rapid motion of mirror. *Fizeau, —.* C. R. 104 (1887) 935-.
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- Rotation of plane of polarisation of light by moving media. *Thomson, J. J.* Camb. Ph. S. P. 5 (1886) 250-.
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- , —, —, —, Michelson and Morley experiments. *Cornu, A.* C. R. 102 (1886) 1207-.
- , —, —, —, in moving media. *Hoek, M.* Amst. Vs. Ak. 2 (1868) (*Ntk.*) 189-; Arch. Néerl. 3 (1868) 180-; Amst. Vs. Ak. 3 (1869) (*Ntk.*) 306-; Arch. Néerl. 4 (1869) 443-.
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- , —, —, —, near rapidly moving matter, experiment. *Lodge, O. J.* B. A. Rp. (1891) 560-.
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- Mascart, É.* C. R. 58 (1864) 1111-; Par. Éc. Norm. A. 4 (1867) 7-; A. C. 13 (1868) 186-.
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- , —, catalogues of spectral rays arranged on. *Stoney, G. J.* B. A. Rp. 42 (1872) 53-.
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- , —, oscillation-frequencies, catalogue. *Stoney, G. J.* B. A. Rp. (1878) 37-.
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- , —, fixed lines. *Gladstone, J. H.* B. A. Rp. (1858) (*pt.* 2) 17.
- , —, radiation, waves, ether. *Broca, A.* Rv. Sc. 6 (1896) 1-.
- , —, scale of Kirchhoff's. *Hartmann, J.* Berl. Ak. Sb. (1898) 742-.
- Spectral lines, reversible, and analogy between their laws of distribution and intensity and those of hydrogen. *Cornu, A.* J. de Ps. 5 (1886) 93-.
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- — — *Ditscheiner, L.* Wien Sb. 50 (1865) (Ab. 2) 296-; 52 (1866) (Ab. 2) 289-; 63 (1871) (Ab. 2) 565-.
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- of, applied to metrology. *Michelson, A. A.* [1890-93] Am. J. Sc. 39 (1890) 115-; Nt. 49 (1893-94) 56-.
- — cube in terms of. *Fabry, C., Macé de Lépinay, J., & Perot, A.* C. R. 128 (1899) 1317-.
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- and metre, progress of experiments for comparing. *Peirce, C. S.* Am. J. Sc. 18 (1877) 51.
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- by refractive indices. *Gibbs, W.* Am. J. Sc. 50 (1870) 45-.
- of sodium as standard of length, interference method. *Michelson, A. A., & Morley, E. W.* Am. J. Sc. 34 (1887) 427-.
- solar lines observed by Kirchhoff, computation. *Airy, (Sir) G. B.* [1867-71] Phil. Trans. 158 (1868) 29-; 162 (1872) 89-.
- of solar spectrum. *Bernard, F.* C. R. 59 (1864) 32-.
- — — *Willigen, V. S. M. van der.* Arch. Néerl. 2 (1867) 115-; Harl. Arch. Ms. Teyl. 1 (1868) 1-, 57-, 280-.
- — —, interference method. *Bernard, F.* C. R. 58 (1864) 1153-.
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- — — — —, relative. *Rowland, H. A.* Ph. Mg. 23 (1887) 257-.
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- — — — — *Michelson, A. A., & Morley, E. W.* Am. J. Sc. 38 (1889) 181-.
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- metres. *Benoît, J. R., & Guillaume, C. É.* Par. Poids et Mes. Tr. Mm. 11 (1895) 16+ lxxxiii pp., 81+ lvi pp.
- , table. *Rowland, H. A.* J. H. Un. Cir. 8 (1888-89) 69, 78.
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- Mouton, L.* Par. S. Ps. Sé. (1879) 199-; C. R. 88 (1879) 1078-; A. C. 18 (1879) 145-.
- Nichols, E. L.* [1886] Kan. Ac. Sc. T. 10 (1887) 111-.
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- Langley, S. P.* B. A. Rp. (1894) 465-.
- Carvalho, E. A. C.* 4 (1895) 5-.
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- — — (Kayser and Runge). *Snow, B. W.* [1893] Ps. Rv. 1 (1894) 221-.
- Bolometer, application. *Geersdaele, J. van.* Rv. Quest. Sc. 40 (1896) 26-.
- , iron-wire. *Edelmann, M. T.* Elekttech. Z. 15 (1894) 81-.
- Bolometric study. *Julius, W. H.* Arch. Néerl. 22 (1888) 310-.
- Flames. *Magnus, G.* Berl. Mb. (1865) 118-.
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- Metallic vapours, emission spectra. *Becquerel, H.* C. R. 97 (1883) 71-; 99 (1884) 374-.
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- *Ångström, K.* Ups. S. Sc. N. Acta 17 (1898) No. 2, 4 pp.
- *Meyer, G.* [1900] Ps. Z. 2 (1901) 6-.
- Rays of great wave-length. *Rubens, H. D.* Nf. Vh. (1896) (Th. 2, Hälfte 1) 54-.
- — — *Rubens, H., & Nichols, E. F.* Ps. Rv. 4 (1897) 314-.
- — —, properties. *Rubens, H., & Nichols, E. F.* A. Ps. C. 60 (1897) 418-.
- at low temperature. *Curie, P., & Desains, P. C. R.* 90 (1890) 1506-.
- , method of rendering visible. *Holthof, F.* Frkf. a. M. Ps. Vr. Jbr. (1884-85) 18-.
- — — — *Lommel, E.* Humb. 3 (1884) 5-; *Erlang, Ps. Md. S. Sb.* 17 (1885) 38-.
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- Sun. *Langley, S. P.* [1883] Wash. Nat. Ac. Mm. 2 (1884) 149-.
- , from $\lambda 7150$ to $\lambda 10,000$. *Abney, (Capt.) W. de W.* [1885] Phil. Trans. 177 (1887) 457-.
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- , —. *Zantedeschi*, F. Wien Sb. 16 (1855) 140-.
- , —. *Meslin*, —. Mntp. Ac. Mm. 2 (1900) vii.
- , —, absolute intensity. *Kelland*, P. [1842] Edinb. R. S. T. 15 (1844) 315-.
- in diffraction. *Lommel*, E. C. J. Erlang. Ps. Md. S. Sb. 7 (1875) 106-; 8 (1876) 1-.
- , —, experiments. *Baumgartner*, A. von. Baumgartner Z. 7 (1830) 399-.
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- , —. *Talbot*, W. H. F. (viii) Ph. Mg. 10 (1837) 364.
- , —. *Poppe*, A. Pogg. A. 95 (1855) 481-.
- , —. *Righi*, A. Bologna Ac. Sc. Mm. 8 (1877) 71-.
- , —. *Lommel*, E. C. J. Carl Rpm. 16 (1880) 455-.
- , —. *Michelson*, A. A. Am. J. Sc. 39 (1890) 216-.
- , —, different methods of causing. *Quincke*, G. A. Ps. C. 132 (1867) 29-.
- , —, new apparent polarity. *Brewster*, (Sir) D. B. A. Rp. (1837) (pt. 2) 12-; Pogg. A. 46 (1839) 481-.
- , —, —. *Powell*, B. B. A. Rp. (1839) (pt. 2) 1-; Ph. Mg. 17 (1840) 81-.
- , —, —. *Airy*, G. B. B. A. Rp. (1840) (pt. 2) 3-; Phil. Trans. (1840) 225-; (1841) 1-.
- , —, —. *Brewster*, (Sir) D. B. A. Rp. (1845) (pt. 2) 7-.
- , —, —. *Powell*, B. B. A. Rp. (1846) (pt. 2) 4.
- , —, —, cases. *Lloyd*, H. [1834] Ir. Ac. T. 17 (1837) 171-.
- , —, —. *Powell*, B. B. A. Rp. (1839) (pt. 2) 1-; Phil. Trans. (1848) 214-.
- , —, phenomenon, undescribed. *Potter*, R. B. A. Rp. (1833) 378-.
- , —, theory, fundamental experiments. *Haidat du Lys*, C. N. A. de. Nancy Mm. S. Sc. (1837) 75-.
- , —, total intensity. *Stokes*, G. G. Edinb. R. S. T. 20 (1853) 317-.
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- method of measuring expansion of metals. *Morley*, E. W., & *Rogers*, W. A. Ps. Rv. 4 (1897) 1-; 106-.
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- in passage of sunbeam through small opening filled with water or oil. *Poppe*, A. (vi Adds.) Frkf. Jbr. Ps. Vr. (1853-54) 36-.
- of quartz threads. *Moll*, D. P. Mbl. Nt. (1895-96) 61-.
- , remarkable. *Sekulić*, M. A. Ps. C. 149 (1873) 126-.
- , — (Sekulić). *Féussner*, W. A. Ps. C. 149 (1873) 561-.
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- , theory. *Mascart*, É. C. R. 73 (1871) 375-; A. C. 23 (1871) 116-.
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- of polarised light. *Mossotti*, O. F. (vi Adds.) Il Cim. 4 (1846) 97-.
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- — rays. *Mascart*, É. J. de Ps. 2 (1873) 153-.
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- Zehnder*, L. Z. Instk. 11 (1891) 275-.
- (modification by Ludwig Mach.) *Mach*, E. Wien Az. 28 (1891) 223-.
- Mach*, L. Wien Ak. Sb. 101 (1892) (Ab. 2a) 5-; Z. Instk. 12 (1892) 89-.
- (Ludwig Mach's experiments.) *Mach*, E. Wien Az. 30 (1893) 199-.
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- , spectral. *Zenker, W. Z.* Instk. 7 (1887) 1-.
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- — —, *Herschel, (Sir) J. F. W.* Edinb. Ph. J. 2 (1820) 114-.
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- Absorption phenomena accompanying diffraction. *Wien, W.* Berl. Ak. Sb. (1885) 817-; A. Ps. C. 28 (1886) 117-.
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- obliquity of ray. *Walton, W.* QJ. Mth. 4 (1861) 1-.
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 — —, apparatus for. *Gibbs*, W. *Am. J. Sc.* 50 (1870) 52-.
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 — — (Herschel). *Whewell*, W. B. A. *Rp.* (1834) 550-.
 — transparent bodies. *Govi*, G. [1864] *Tor. Lav. Sc. Fis. Mt.* (1869) 43-.
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- , holmium and thulium. *Forsling, S.* [1898] Stockh. Ak. Hndl. Bh. 24 (Afd. 1) (1899) No. 7, 35 pp.; Fsehr. Ps. (1898) (Ab. 2) 58.
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- , *Janssen, J.* C. R. 102 (1886) 1352-.
- , *Budde, E.* Berl. Ps. Gs. Vh. (1888) 89-.
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- and pernitric anhydride. *Chappuis, J.* Par. S. Ps. Sé. (1882) 130-.
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- photography. *Abney, (Capt.) W. de W.* L. Ps. S. P. 3 (1880) 43-; Ph. Mg. 7 (1879) 313-.
- photometry, application to quantitative analysis. *Vierordt, K.* Rv. Cours. Sc. 5 (1873) 304-.
- pigments. *Slack, H. J.* Intell. Obs. 8 (1866) 348-.
- projection. *Bode, P.* Frkf. a. M. Ps. Vr. Jbr. (1891-92) 31-.
- rare earths. *Bailey, G. H.* B. A. Rp. (1887) 654.
- , *Kiesewetter, P., & Krüss, G.* Berl. B. 21 (1888) 2310-.
- , *Erner, F. M.* Wien Ak. Sb. 108 (1899) (Ab. 2a) 1252-.
- rays of high refrangibility. *Huntington, A. K.* B. A. Rp. (1880) 303-.
- samarskite derivatives. *Soret, J. L.* C. R. 88 (1879) 422-.
- selenium, tellurium, etc. *Gernez, D.* C. R. 74 (1872) 1190-.
- sodium and other metals. *Secchi, A.* Palermo Mm. Spet. It. 2 (1873) 67-.
- , simple method of exhibiting spectrum. *Kreusler, H.* C. Ztg. 23 (1899) 37-.
- sulpharsenate. *Formánek, J.* Prag Sb. (1888) (Mth. Nt.) 86-; Fsch. Ps. (1888) (Ab. 2) 57-.
- and solar spectrum, photomicrography. *Castellarnau, J. M. de.* [1889] Mer. S. J. (1892) 424-.
- solutions (very dilute). *Knoblauch, O.* A. Ps. C. 43 (1891) 738-.
- (aqueous) of copper salts. *Ewan, T.* Ph. Mg. 33 (1892) 317-.
- of cupric bromide. *Sabatier, P.* C. R. 118 (1894) 1042-, 1144-.
- didymium nitrate. *Rood, O. N.* Silliman J. 34 (1862) 129-.
- nitrogen peroxide, chlorine peroxide and chlorous acid. *Gernez, D.* C. R. 74 (1872) 465-.
- (aqueous) of salts, variation with temperature and concentration. *MacGregor, J. G.* [1891] Cn. R. S. P. & T. 9 (1892) (Sect. 3) 27-.
- same substance under different conditions. *Vogel, H. W.* Berl. B. 11 (1878) 913-, 1363-.
- (Vogel). *Moser, J.* Berl. B. 11 (1878) 1416-.
- (Moser). *Vogel, H. W.* Berl. B. 11 (1878) 1562-.
- sulphur vapour. *Salet, G.* C. R. 74 (1872) 865-.
- , and vapours of selenious acid and hypochlorous anhydride. *Gernez, D.* C. R. 74 (1872) 803-.
- sun near horizon, influence of density and thickness of oxygen layer in air. *Janssen, —.* Leip. As. Gs. Vjschr. 24 (1889) 244.
- thin metallic films. *Dudley, W. L.* Am. C. J. 14 (1892) 185-.
- ultramarines. *Wunder, J.* Berl. B. 9 (1876) 295-.
- ultra-violet. *Nichols, E.* Ps. Rv. 2 (1895) 302-.
- , of liquids. *Soret, J. L.* Sch. Nf. Gs. Vh. 60 (1876-77) 51-.
- , nitric and nitrous ethers. *Rilliet, A. A., & Soret, J. L.* C. R. 89 (1879) 747-.
- uranium salts, fluorescent and absorption spectra. *Bolton, H. C., & Morton, H.* Am. C. 3 (1873) 361-, 401-; 4 (1874) 1-, 41-, 81-.

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- use of comparison prisms with. *Gaenge, C.* *Jena. Sb.* (1881) 33-.
- water. *Soret, J. L., & Sarasin, É.* *C. R.* 98 (1884) 624-; *Gen. S. Ps. Mm.* 29 (1884-87) No. 11, 18-.
- vapour. *Janssen, J. [P. J. C.]* *C. R.* 63 (1866) 289-; *B. A. Rp.* 39 (1869) (Sect.) 67-; *A. C.* 24 (1871) 215-; *C. R.* 95 (1882) 885-.
- —. Balloon ascent of Crocé-Spinelli and Sivel. *Janssen, P. J. C.* *C. R.* 78 (1874) 995-.
- wave-length and intensity. *Abney, (Capt.)* —, & *Festing, (Col.)* —. *R. S. P.* 38 (1885) 77-.
- spectroscopic measurements. *Vierordt, K.* *A. Ps.* C. 140 (1870) 172-.
- strong, by metals. *Glan, P.* *A. Ps.* C. 59 (1896) 401-.
- at different temperatures. *Feussner, W.* *Berl. Mb.* (1865) 144-.
- theory. *O'Brien, M.* [1843] *Camb. Ph. S.* T. 8 (1849) 27-.
- , mathematical. *Skiba, E. W.* [1873] (*xii*) *Krk. Ak. (Mt.-Prz.)* Pam. 1 (1874) 105-.
- , Maxwell's. *Grinwis, C. H. C.* *Amst. Ak. Vs. M.* 10 (1876) 371-; *Arch. Néerl.* 12 (1877) 177-.
- of great thicknesses of metallic and metalloidal vapours. *Lockyer, J. N.* *R. S. P.* 22 (1874) 371-.
- by tourmaline. *Potier, A.* *C. R.* 114 (1892) 874.
- transparent bodies, light vibrations. *Lamé, G.* *A. C.* 57 (1834) 211-.
- —, so-called. *Krüß, H.* [1889] *Hamb. Nt. Vr. Ab.* 11 (1891) (*Heft 1, No. 3*) 28 pp.
- and translucent glass. *Stort, T.* *Elekt. tech. Z.* 16 (1895) 500-.
- transverse. *Ackroyd, W.* *C. N.* 36 (1877) 159-.
- of ultra-violet. *Soret, J. L.* *Arch. Sc. Ps.* Nt. 61 (1878) 322-; *C. R.* 86 (1878) 708-; *Arch. Sc. Ps. Nt.* 63 (1878) 89-; *C. R.* 86 (1878) 1062-; *Arch. Sc. Ps. Nt.* 4 (1880) 261-; *C. R.* 88 (1879) 1077-; *Arch. Sc. Ps. Nt.* 9 (1883) 513-; 10 (1883) 429-; *C. R.* 88 (1879) 1012-; 97 (1883) 314-, 572-, 642-, 1269-.
- —. *Dewar, J., & Liveing, G. D.* *R. S. P.* 35 (1883) 71-.
- —. *Soret, J. L.* *Arch. Sc. Ps. Nt.* 18 (1887) 317-, 344-.
- —. *Glan, P.* *A. Ps.* C. 58 (1896) 131-; 59 (1896) 155-.
- — by metals. *Trowbridge, J., & Sabine, W. C.* *Am. Ac. P.* 23 (1888) 299-.
- — organic substances. *Soret, J. L., & Rilliet, A. A.* *C. R.* 110 (1890) 137-.
- — ozone. *Cornu, A.* *As. Fr. C. R.* (1884) (*Pt. 1*) 161.
- — vapours and liquids. *Pauer, J. A.* *Ps. C.* 61 (1897) 363-.
- — water and ice. *Schömm, J. L.* *Wien Met. Z.* 15 (1880) 57-.
- and undulatory theory. *Wrede, F. J.* *Stockh. Ak. Hndl.* (1834) 318-; *Pogg. A.* 33 (1834) 353-.

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- and undulatory theory (Wrede). *Powell, B.* *B. A. Rp.* (1837) (*pt. 2*) 16-.
- —. *Osann, G.* [1859] *Würzb. Vh.* 10 (1860) 1-.
- by uranyl salts. *Deussen, E.* *A. Ps.* C. 66 (1898) 1128-.

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- Forel, F. A.* *C. R.* 106 (1888) 1004-.
- Häfner, G., & Albrecht, E.* *A. Ps.* C. 42 (1891) 1-.
- lake of Geneva. *Forel, F. A.* *C. R.* 84 (1877) 311-; *Arch. Sc. Ps. Nt.* 59 (1877) 137-.
- —. *Soret, J. L.* *Arch. Sc. Ps. Nt.* 12 (1884) 158-.
- —. *Rilliet, A.* *Sch. Nf. Gs. Vh.* (1885-86) 45-; *Gen. S. Ps. Mm.* 29 (1884-87) No. 11, 26 pp.
- —. *Forel, F. A.* *As. Fr. C. R.* (1888) (*Pt. 2*) 192-.
- — and Mediterranean Sea. *Fol, H., & Sarasin, É.* *C. R.* 99 (1884) 783-; 100 (1885) 991-; 102 (1886) 1014-; *Gen. S. Ps. Mm.* 29 (1884-87) No. 13, 18 pp.
- — —, seasonal and local variations of transparency. *Forel, F. A.* *Arch. Sc. Ps. Nt.* 27 (1892) 566-.
- sea. *Secchi, (padre) A.* *N. Cim.* 20 (*1864) 205-.
- *Cialdi, A., & Secchi, A.* *C. R.* 61 (1865) 100-.
- *Kny, C. I. L.* *Berl. Nf. Fr. Sb.* (1877) 217-.
- *Verrill, A. E.* *Science* 4 (1884) 8-.
- *Davis, W. M.* *Science* 4 (1884) 94.
- *Provenzali, F. S.* *Rm. N. Line. At.* 38 (1885) 9-.
- *Fol, H.* *As.* (1891) 255-.
- turbid. *Soret, J. L., & Sarasin, É.* *Gen. S. Ps. Mm.* 29 (1884-87) No. 11, 21-.
- by zircon. *Linnemann, E.* *Wien Ak. Sb.* 92 (1886) (*Ab. 2*) 427-; *Mh. C.* (1885) 531-.
- Shades of paint, comparing. (Tintometer.) *Dudley, C. B., & Pease, F. N.* *Am. Eng. & Railroad J.* 70 (1896) 212-.
- Spectral lines, broadening. *Lommel, E. von.* *A. Ps.* C. 56 (1895) 741-.
- of metallic vapour corresponding to black lines in solar spectrum. *Brewster, (Sir) D.* [1867] *Edinb. R. S. P.* 6 (1869) 145-.
- — —, reversal. *Cornu, A.* *C. R.* 73 (1871) 332-.
- — —. *Dewar, J., & Liveing, G. D.* *R. S. P.* 27 (1878) 132-, 350-, 494-; 28 (1879) 352-, 367-, 471-; 29 (1879) 402-; 32 (1881) 402-.
- — — nitrogen peroxide, dependence of distance apart on thickness of absorbing layer. *Weiss, A. J.* *Wien SB.* 43 (*Ab. 2*) (1861) 208-.
- —, prismatic, produced by passage of light through coloured vapours and gases, and from coloured flames. *Müller, W. A.* *Ph. Mg.* 27 (1845) 81-.
- —, reversal. *Duhem, —.* *J. de Ps.* 4 (1885) 221-.

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- Spectral lines, sodium, reversal. *Soret, J. L.* Arch. Sc. Ps. Nt. 41 (1871) 64-.
- , —, —, lecture experiment. *Tumlirz, O.* Exner Rpm. 23 (1887) 404-.
- , —, — in oxyhydrogen flame, apparatus for. *Pellin, —.* As. Fr. C. R. (1889) (Pt. 1) 259.
- , —, solar, and those produced by atmosphere and nitrous acid gas. *Brewster, (Sir) D.* [1833] Edinb. R. S. T. 12 (1834) 519-.
- , —, and terrestrial, distinction between. *Cornu, A. L. Ps. S. P.* 8 (1887) 95-; Ph. Mg. 22 (1886) 458-.
- Spectrophotometric study of pigments. *Nichols, E. L. Am. J. Sc.* 28 (1884) 342-.
- Spectroscopic examination of aniline dyes. *Schoop, P. Rpm. Anal. C.* 6 (1886) 242-.
- , —, blood. *Menegazzi, G. P. Ven. I. At.* (1892-93) 1660-.
- , —, —, *Levin, L. Arch. Phm.* 235 (1897) 245-.
- Spectroscopy, modern. *Schuster, A.* [1881] R. I. P. 9 (1882) 493-.
- of ozone. *Chappuis, J., & Hautefeuille, P. C. R.* 91 (1880) 228-; Par. S. C. Bl. 35 (1881) 2-.
- , —, —, *Chappuis, J. Par. Éc. Norm. A.* 11 (1882) 137-.
- Spectrum analysis, physiological. *Vierordt, C. von. Z. Bl.* 10 (1874) 21-, 399-; 11 (1875) 187-; 14 (1878) 422-.
- , solar, constitution and origin of group B. *Thollon, L. J. de Ps.* 3 (1884) 421-.
- , —, purple of. *Koechlin, C. Mon. Sc.* 28 (1886) 1105-.
- , —, transmission of chemical rays through different media. *Somerville, M. C. R.* 3 (1886) 473-.
- Sunlight colours. *Abney, (Capt.) W. de W.* [1887] R. I. P. 12 (1889) 61-.
- and Earth's atmosphere. *Langley, S. P.* [1885] R. I. P. 11 (1887) 265-.

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- of air. *Riccd, A. Spet. It. Mm.* 5 (1876) (App.) 37-.
- , —, upper strata. *Schultheiss, C. Karlsruhe Nt. Vr. Vh.* 13 (1900) (Ab.) 262-.
- , coloured flames. *Gouy, A. C. R.* 86 (1878) 878-, 1078-.
- , Foucault's mirrors, etc., for actinic rays. *Chardonnet, E. de. C. R.* 93 (1881) 406-; 94 (1882) 1171-, 1468-.
- , glass for ultra-violet light. *Schumann, V. Wien Pht. Cor.* 22 (1885) 28-, 59-, 188-.
- , metals. *Wien, W. A. Ps. C.* 35 (1888) 48-.
- , a-monobromnaphthalene for ultra-violet light, and its high refractive power. *Walter, B. A. Ps. C.* 42 (1891) 511-.
- , opaque bodies for red and infra-red rays. *Le Bon, G. C. R.* 128 (1899) 297-; Rv. Sc. 11 (1899) 161-.
- , platinum. *Aubel, E. van. Brux. Ac. Bl.* 11 (1886) 408-.
- , —, and of electrolysed mirrors of iron, nickel, and cobalt. *Aubel, E. van. Brux. Ac. Bl.* 12 (1886) 665-.

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- of solutions of colourless salts. *Spring, W. Brux. Ac. Bl.* 31 (1896) 640-.
- , —, influence of temperature. *Nichols, E. L., & Spencer, M. C. Ps. Rv.* 2 (1895) 344-.
- , —, for X-rays, relative, method for determination. *Robb, W. L. Science* 3 (1896) 544.
- , thin laminæ of silver, influence of temperature. *Pettinelli, P. N. Cim.* 2 (1895) 356-.
- Transparent metallic films. *Wernicke, W. A. Ps. C.* 30 (1887) 469-.
- Turbid media, transmission of light in. *Compan, P. C. R.* 128 (1899) 1226-.
- , water, heating effects of light. *Humphreys, H. Silliman J.* 49 (1845) 208-.
- Ultra-violet rays. *Schönn, J. L. A. Ps. C.* 9 (1880) 483-; 10 (1880) 143-.
- , —, —, *Schönn, J. L. Arch. Sc. Ps. Nt.* 4 (1880) 510-.
- , —, protection of eye from. *Schulek, V. Mth. Term. Ets.* 17 (1899) 510-; Mth. Nt. B. Ung. 17 (1901) 341.
- Undulatory theory of light, arguments against. *Jessen, C. Berl. Nf. Fr. Sb.* (1887) 108-.
- Uranium glass, use in electric lighting. *Brachet, A. C. R.* 72 (1871) 493.
- , and iron glasses, use in electric lighting. *Brachet, A. C. R.* 72 (1871) 509-.
- Vibrations of the ether, and explanation of dispersion and its anomalies. *Sellmeier, W. A. Ps. C.* 145 (1872) 399-, 520-; 147 (1872) 386-, 525-.
- Vulcanite, properties. *Mayer, A. M. Am. J. Sc.* 41 (1891) 54-.

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- Kries, F. Gehlen J.* 7 (1808) 201-.
- Poisson, S. D. J. Mines* 36 (1814) 439-.
- Fourier, J. B. J. A. C.* 4 (1817) 123-.
- Buff, H. Lieb. A.* 32 (1839) 129-.
- Bellavitis, G. [1840] Tortolini A.* 1 (1850) 362-.
- Melloni, M. C. R.* 20 (1845) 575-.
- Knoblauch, H. Berl. B.* (1846) 355-.
- Henry, J. Silliman J.* 5 (1848) 113-.
- Zantedeschi, F. Wien SB.* 24 (1857) 43-.
- Stewart, B. Edinb. R. S. T.* 22 (1861) 59-.
- Zantedeschi, F. Ven. At.* 7 (1861-62) 365-.
- La Provostaye, F. H. de. A. C.* 67 (1863) 1-.
- Tyndall, J. Phil. Trans.* 154 (1864) 327-.
- Ericsson, J. Nt.* 7 (1873) 273-.
- Wenström, J. Stockh. Öfv.* 36 (1879) No. 4, 41-.
- Absorbing and emissive powers, equality. *La Provostaye, F. H. de. C. R.* 57 (1863) 517-.
- , power of athermanous bodies. *Desains, P., & La Provostaye, F. de. C. R.* 31 (1850) 770-; A. C. 30 (1850) 431-.
- , —, —, bodies. *Aymonnet, —. C. R.* 83 (1876) 971-.
- , —, —, influence of roughness. *Melloni, M. [1838] Nap. At. Ac.* 5 (1843) 103-.

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- Absorbing power and chemical equivalents, relations. *Aymonnet*, —. Par. S. C. Bll. 26 (1876) 535-.
- , demonstration of differences in. *Ferrini, R. E. D. T.* (xii) Rv. Sc.-Ind. 6 (1874) 184-.
- of lamp-black. *Crova*, —, & *Compan*, —. C. R. 126 (1898) 707-.
- , low, of metals. *Holtz, W.* A. Ps. C. 20 (1883) 703-.
- of polished and striated metals, differences. *Melloni, M.* C. R. 12 (1841) 375-.
- — solids for solar radiation, new method for measuring. *Bartoli, A.*, & *Stracciati, E.* Catania Ac. Gioen. Bll. 23-24 (1892) 10-.
- Prevost, P.* Phil. Trans. (1802) 403-.
- Desains, P.* C. R. 65 (1867) 406-.
- Ångström, K.* Sk. Nf. F. (1898) 196.
- by alum. *Hutchins, C. C.* Am. J. Sc. 43 (1892) 526.
- atmospheric. *Maurer, J.* Zür. Vjschr. 34 (1889) 63-.
- by carbon dioxide. *Keeler, J. E.* Am. J. Sc. 28 (1884) 190-.
- , of long wave radiation. *Kurlbaum, F.* A. Ps. C. 61 (1897) 417-.
- and chemical equivalent. *Aymonnet*, —. Par. S. C. Bll. 26 (1876) 535-.
- by coloured glass vessel, evaporation of water in. *Baudrimont, A.* C. R. 89 (1879) 41-; Bordeaux S. Sc. Mm. 3 (1880) 401-.
- crystals in infra-red. *Merritt, E.* Ps. Rv. 2 (1895) 424-.
- dry and moist air. *Wild, H.* Bern Mt. (1866) 237-.
- — —. *Cicognani, E.* (xii) Rv. Sc.-Ind. 11 (1879) 334-.
- and emission. *Magnus, G.* Berl. Mb. (1869) 482-.
- and reflection. *Magnus, G.* Berl. Ab. (1869) (Ps.) 201-.
- by film of vapour. *Magnus, G.* A. Ps. C. 130 (1867) 207-.
- — — (Magnus). *Tyndall, J.* Ph. Mg. 33 (1867) 425.
- gaseous bodies, of low radiant heat. *MacGregor, J. G.* [1882] Edinb. R. S. P. 12 (1884) 24-.
- gases. *Heine, H.* Giessen Oberh. Gs. B. 21 (1882) 17-.
- , measurement. *Tait, P. G.* B. A. Rp. (1882) 475.
- and vapours, of obscure heat rays. *Lecher, E.*, & *Pernter, J. M.* [1880] Wien Ak. Sb. 82 (1881) (Ab. 2) 265-.
- glass. *Schneebeli, H.* Zür. Vjschr. 29 (1884) 56-.
- ice in infra-red. *Saunders, F. A. J. H.* Un. Cir. [18 (1898-99)] 58-.
- lamp-black and metals, constancy. *Melloni, M.* C. R. 11 (1840) 678-; Nap. At. Ac. Sc. 5 (1843) 77-.
- liquids. *Barrett, W. F.* Ph. Mg. 36 (1868) 206-.

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- by liquids. *Lachowicz, B.* Berl. B. 20 (1887) 735-; 1400; Krk. Ak. (Mt.-Prz.) Rz. 17 (1888) 69-.
- *Friedel, C.* A. Ps. C. 55 (1895) 453-.
- *Zsigmondy, R.* A. Ps. C. 57 (1896) 639-.
- and glass. *Zsigmondy, R.* Dingler 289 (1893) 237-.
- — vapours. *Desains, P.* C. R. 64 (1867) 1086-.
- mica plates, dependence on temperature. *Edler, J.* A. Ps. C. 40 (1890) 531-.
- and radiation, experiments. *Bache, A. D.* Silliman J. 28 (1835) 320-.
- selective, by water. *Melloni, M.* A. C. 48 (1831) 385-.
- by water vapour. *Haga, H.* [1876] A. Ps. C. 160 (1877) 31-.
- — (Haga). *Hoorweg, J. L.* J. de Ps. 6 (1877) 155-.
- — and carbon dioxide. *Lecher, E.* [1882] Wien Ak. Sb. 86 (1883) (Ab. 2) 52-.
- —, experiments. *Röntgen, W. C.* Giessen Oberh. Gs. B. 23 (1884) 49-.
- Action of gases and vapours on radiant heat. *Tyndall, J.* [1861] R. I. P. 3 (1858-62) 295-.
- — intermittent beam of radiant heat on gases. *Tyndall, J.* R. S. P. 31 (1881) 307-; 478-.
- Aqueous vapour, relation of radiant heat to. *Tyndall, J.* [1862] Phil. Trans. (1863) 1-.
- Colour and mechanical state, effect on radiant heat. *Tyndall, J.* Phil. Trans. 156 (1866) 83-.
- Decrease of radiant heat in proportion to distance, law. *Melloni, M.* Bb. Un. 13 (1838) 371-.
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- Powell, B.* Ph. Mg. 8 (1836) 186-.
- Melloni, M.* C. R. 9 (1839) 315-.
- Aesculin solutions. *WeSENDONCK, K.* A. Ps. C. 23 (1884) 548-.
- Air and hydrogen. *Buff, H.* Berl. Ak. Mb. (1876) 89; Ph. Mg. 4 (1877) 401-.
- — (Buff). *Tyndall, J.* [1879] R. S. P. 30 (1880) 10-.
- , moist. *Hoorweg, J. L.* J. de Ps. 5 (1876) 97-.
- , — and dry. *Magnus, G.* Berl. Mb. (1863) 149-.
- — —. *Tyndall, J.* (viii) Ph. Mg. 26 (1863) 44-.
- , —; — hygroscopic properties of rock salt. *Magnus, G.* Berl. Mb. (1861) 1128-.
- , —, Tyndall's and Magnus's experiments. *Hoorweg, J. L.* A. Ps. C. 155 (1875) 385-.
- Aqueous vapour. *Magnus, G.* A. Ps. C. 130 (1867) 207-.
- — (Magnus). *Tyndall, J.* Ph. Mg. 33 (1867) 425.
- Bodies (various). *Melloni, M.* Pogg. A. 28 (1833) 371-.
- , diathermancy to heat from different sources. *Melloni, M.* [1833-39] B. A. Rp. (1833) 381-; Nap. At. Ac. Sc. 5 (1843) 1-.

- Bodies, diathermancy to heat from different sources. (Thermochromy.) *Zantedeschi, F.* Ven. At. 5 (1846) 26-.
- , —, —, —, —. (Thermochrosis, or calorific coloration.) *Melloni, M.* Bb. Un. Arch. 14 (1850) 177-, 257-.
- Crystals. *Knoblauch, H.* Pogg. A. 85 (1852) 169-; 93 (1854) 161-.
- Ebonite. *Abney, (Capt.) W. de W., & Festing, (Col.)*— L. Ps. S. P. 4 (1881) 256-; Ph. Mg. 11 (1881) 466-.
- , *Arnd, R.* Tor. Ac. Sc. At. 28 (1893) 746-.
- , *Becquerel, H.* C. R. 124 (1897) 984-.
- , *Perrigot, —.* C. R. 124 (1897) 1087-.
- , *Bianchi, E.* N. Cim. 8 (1898) 285-.
- Ferrous solutions. *Zsigmondy, R.* A. Ps. C. 49 (1893) 531-, 760.
- Flame. *Williams, W. M.* Nt. 6 (1872) 506-.
- , *Ericsson, J.* Nt. 7 (1873) 149-.
- Fluids. *Volta, A.* Rv. Sc.-Ind. 17 (1885) 212-.
- Gaseous layers. *Stoney, G. J.* [1877] Dubl. S. Sc. T. 1 (1877-83) 13-.
- media, effect of pressure on diathermancy. *Corrigan, S. J.* As. & Asps. 11 (1892) 1-, 108-.
- Gases. *Tyndall, J.* [1859] Bb. Un. Arch. 5 (1859) 231-; R. S. P. 10 (1859-60) 37-.
- , *Magnus, G.* Berl. Mb. (1861) 246-.
- , *Brush, C. F.* Am. As. P. (1897) 94-.
- Glass. *Delaroche, F. J.* de Ps. 75 (1812) 201-; *Nicholson J.* 30 (1812) 192-.
- , *Ritchie, W.* Edinb. Ph. J. 11 (1824) 281-; 12 (1825) 15-.
- , *Powell, B.* Phil. Trans. (1825) 187-; (1826) 372-.
- (Ritchie). *Powell, B.* Thomson A. Ph. 12 (1826) 13-.
- (Powell). *Ritchie, W.* Thomson A. Ph. 12 (1826) 122-.
- , *Hudson, H.* B. A. Rp. (1835) 163-, (pt. 2) 9-.
- , *Powell, B.* B. A. Rp. (1835) (pt. 2) 9-.
- (Hudson and Powell). *Melloni, M.* A. C. 60 (1835) 410-; Ph. Mg. 7 (1835) 475-.
- (Melloni). *Powell, B.* Ph. Mg. 8 (1836) 23-.
- (Melloni and Powell). *Hudson, H.* Ph. Mg. 8 (1836) 109-.
- and mica, effect of temperature on diathermancy. *Pettinelli, P.* N. Cim. 2 (1895) 156-.
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— — and acids. *Gladstone, J. H., & Hibbert, W. B. A. Rp.* (1895) 637; C. S. J. 67 (1895) 831-; 71 (1897) (Pt. 2) 822-.

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— — — (Janovsky). *Brühl, J. W.* Berl. B. 14 (1881) 1306-.

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— — (for infinitely long wave-lengths). *Landolt, H., & Jahn, H.* Berl. Ak. Sb. (1892) 729-.

— — *Jahn, H., & Möller, G.* Z. Ps. C. 13 (1894) 385-.

— — *Brühl, J. W.* Berl. B. 30 (1897) 153-.

— — of high dispersive power. *Nasini, R.* Rm. R. Ac. Linc. Rd. 3 (1887) (Sem. 1) 128-, 164-.

— cyanides and isocyanides. *Costa, T.* Rm. R. Ac. Linc. Rd. 7 (1891) (Sem. 2) 308-.

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— thiocyanates, isothiocyanates and thiophen. *Nasini, R., & Scala, A.* Rm. R. Ac. Linc. Rd. 2 (1886) (Sem. 1) 617-.

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- specific, of elements and their compounds. *Gladstone, J. H.* C. S. J. 3 (1865) 108-.
- , influence of double linkage. *Nasini, R.* Rm. R. Ac. Linc. T. 8 (1884) 169-, xvi.
- , of liquids, new formula. *Zecchini, F.* Gz. C. It. 25 (1895) (Pt. 2) 269-.
- , and molecular weight, relation between. *Guyé, P.* Arch. Sc. Ps. Nt. 23 (1890) 183-.
- , the periodic law. *Gladstone, J. H.* B. A. Rp. (1895) 609-.
- , of solids, determination from their solutions. *Brit. Ass. Comm.* B. A. Rp. (1881) 155-.

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- , of chlorine, bromine and iodine. *Gladstone, J. H.* B. A. Rp. 36 (1866) (Sect.) 37.
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- in isomorphous biaxial crystals. *Perrot, F. L.* [1890-92] Arch. Sc. Ps. Nt. 25 (1891) 26-; 29 (1893) 28-, 121-.
- molecular. *Gladstone, J. H.* C. S. J. 59 (1891) 290-.
- , of very dilute solutions. *Dijken, D. Z.* Ps. C. 24 (1897) 81-.
- , recent determinations. *Gladstone, J. H.* L. Ps. S. P. 12 (1894) 153-; Ph. Mg. 35 (1893) 204-.
- , of substances in solution. *Gladstone, J. H.* C. S. J. 59 (1891) 589-.
- of various organic compounds. *Perkin, W. H.* C. S. J. 69 (1896) 1025-, [1756].
- relations, and chemical composition, connection. *Mitscherlich, E.* Berl. B. (1846) 86.
- and sensitiveness of liquids. *Gladstone, J. H., & Dale, T. P.* Phil. Trans. (1863) 317-.
- of silver iodide, bromide and chloride. *Wernicke, W.* A. Ps. C. 142 (1871) 560-.
- — — (Wernicke). *Schultz-Sellack, C.* A. Ps. C. 144 (1872) 331-.
- specific. *Gladstone, J. H.* As. Fr. C. R. (1885) (Pt. 2) 270-.
- , of alums. *Gladstone, J. H.* L. Ps. S. P. 7 (1886) 194-; Ph. Mg. 20 (1885) 162-.
- , isomeric bodies. *Gladstone, J. H.* [1880] L. Ps. S. P. 4 (1881) 94-; Ph. Mg. 11 (1881) 54-.
- , liquids. *Gladstone, J. H.* B. A. Rp. (1881) 591.

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- Refractive and dispersive energy, specific, of essential oils. *Gladstone, J. H.* C. S. J. 49 (1886) 609-.
- energies and combining proportions of metals, relation. *Gladstone, J. H.* B. A. Rp. 39 (1869) (Sect.) 22-.
- energy and molecular volume of some sodium salts. *Dufet, H.* Par. S. Ps. Sé. (1887) 117-.
- , specific. *Dale, T. P., & Gladstone, —.* B. A. Rp. (1863) (pt. 2) 12-.

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- compound ethers. *Delfs, W.* Pogg. A. 81 (1850) 470-.
- and density and boiling point of some organic liquids. *Delfs, W.* Lieb. A. 92 (1854) 277-.
- , molecular weight and diathermancy, connection between. *Aymonnet, —.* C. R. 113 (1891) 418-.
- homologous compounds. *Landolt, H. H.* Pogg. A. 117 (1862) 352-; Rheinl. Westphal. Sb. 19 (1862) 180-.
- isomorphous biaxial crystals. *Perrot, F. L.* [1892] Arch. Sc. Ps. Nt. 29 (1893) 28-, 121-.
- mixtures. *Dufet, H.* C. R. 99 (1884) 990-.
- —, in relation to chemical composition. *Fock, A.* (xii) Z. Kr. 4 (1880) 583-.
- mixture of two fluids, calculation. *Hoek, M.* Pogg. A. 112 (1861) 347-.
- normal salt solutions. *Bender, C.* A. Ps. C. 39 (1890) 89-; A. Ps. 2 (1900) 186-.
- — — and water. *Bender, C.* A. Ps. C. 68 (1899) 343-; 69 (1899) 676-.
- organic compounds, relation to chemical constitution. *Bernheimer, O., & Nasini, R.* Rm. R. Ac. Linc. T. 7 (1883) 227-; Rm. R. Ac. Linc. Mm. 18 (1883) 608-.
- substances. *Kanonnikov, I. J.* Pr. C. 32 (1885) 497-.
- salt solutions. *Walter, B.* A. Ps. C. 38 (1889) 107-; C. R. 110 (1890) 708-.
- substitution products of carbonic ether. *Wiedemann, E.* J. Pr. C. 114 (1873) 453-.

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- anomalous, of phenylic bases. *Zecchini, F.* Rm. R. Ac. Linc. Rd. 2 (1893) (Sem. 1) 491-.
- benzenoid hydrocarbons. *Perkin, W. H.* C. S. J. 77 (1900) (Pt. 1) 267-.
- bodies. *Marx, C. M.* Schweigger J. 52 (=Jb. 22) (1828) 386-.
- and calorific power, relation. *Montigny, C.* [1866] Brux. Mm. Cour. Svo. 19 (1867) (No. 2) 41 pp.
- chemical constitution, relation. *Mohr, C. F.* D. C. Gs. B. 4 (1871) 149-; Z. Mth. Ps. 16 (1871) 492-.
- — —, *Kanonnikov, I. I.* (xii) Rs. Ps. C. S. J. 15 (Pt. 1) (1883) 434-; (x) Berl. B. 16 (1883) 3047-.

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- and chemical constitution, relation. *Nasini, R.* [1899] *Ven. I. At.* (1899-1900) (Pt. 2) 211-.
- — —, theory. *Nasini, R.* *Gz. C. It.* 20 (1891) 1-.
- meta-cinnamene. *Madan, H. G.* *C. S. P.* 1 (1885) 106-, iii.
- and composition, relations. *Kanonnikov, I.* *Rs. Ps.-C. S. J.* 16 (C.) (1884) 119-; *Berl. B.* 17 (1884) (Ref.) 157-.
- — —, *Flavickij, F.* *Rs. Ps.-C. S. J.* 16 (C.) (1884) 260-.
- — —, *Kanonnikov, I. I.* *Rs. Ps.-C. S. J.* 16 (C.) (1884) 448-.
- compounds. *Kanonnikov, I.* *J. Pr. C.* 31 (1885) 321-; 32 (1885) 497-.
- containing the carbonyl radicle. *Nasini, R., & Anderlini, F.* [1893] *Ven. I. At.* (1893-94) 307-.
- , influence of simple and multiple union, constitution of benzene and naphthalene compounds. *Brühl, J. W.* *Berl. B.* 20 (1887) 2288-.
- constancy. *Ketteler, E.* *A. Ps. C.* 30 (1887) 285-.
- and dispersive power of aromatic compounds, relations. *Costa, T.* *Rm. R. Ac. Linc. Mm.* 6 (1889) 246-.
- — — silicon in its compounds. *Abati, G.* *Gz. C. It.* 27 (1897) (Pt. 2) 437-.
- gases. *Dulong, P. L.* [1825] *Par. Mm. Ac. Sc.* 7 (1827) 345-.
- , inactive. *Ramsay, W.* *Arch. Néerl.* 5 (1900) 356-.
- , mixtures. *Ramsay, W., & Travers, M. W.* *B. A. Rp.* (1897) 587-; *R. S. P.* 62 (1898) 225-.
- high, of some organic substances. *Madan, H. G.* *L. Ps. S. P.* 7 (1886) 364-; *Ph. Mg.* 21 (1886) 245-.
- influence of electrolytic dissociation and of solvent. *Le Blanc, M., & Rohland, P.* *Z. Ps. C.* 19 (1896) 261-.
- investigation of co-existing phases in mixtures of acetone and ether by. *Cunaeus, E. H. J.* *Amst. Ak. Vs.* 8 (1900) 191-, 502; *Amst. Ak. P.* 2 (1900) 101-, 408.
- liquid mixtures. *Zecchini, F.* *Gz. C. It.* 27 (1897) (Pt. 1) 358-.
- liquids. *Fabri, R., & Farini, L.* *Bologna Ac. Sc. Mm.* 6 (1884) 23-.
- metallic carbonyls. *Ferreira de Silva, A. I.* *Par. S. C. Bil.* 15 (1896) 835-.
- (Ferreira de Silva). *Nasini, R.* *Ven. I. At.* (1896-97) 1087-.
- mixtures. *Perkin, W. H.* *C. S. J.* 77 (1900) (Pt. 1) 287-.
- organic compounds, influence of structure. *Kanonnikov, I. I.* (xii) *Kazan Un. Mm.* (1880) (Pt. 2) 179-; (x) *Berl. B.* 14 (1881) 1697-.
- — in solutions. *Kanonnikoff, J.* *J. Pr. C.* 27 (1883) 362-.
- organo-metallic compounds. *Ghira, A.* *Rm. R. Ac. Linc. Rd.* 3 (1894) (Sem. 1) 391-.
- phosphorus. *Zecchini, F.* *Rm. R. Ac. Linc. Rd.* 1 (1892) (Sem. 2) 433-; 2 (1893) (Sem. 1) 31-, (Sem. 2) 193-.

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- for ray of infinite wave-length. *Nasini, R.* *Rm. R. Ac. Linc. Rd.* 2 (1893) (Sem. 1) 161-.
- solutions. *Sundvik, E. E.* *Helsingf. Öfv.* 39 (1897) 1-.
- and specific inductive capacity. *Pagliani, S.* *Rm. R. Ac. Linc. Rd.* 2 (1893) (Sem. 2) 48-.
- tellurium derivatives. *Pellini, G., & Menin, A.* *Gz. C. It.* 30 (1900) (Pt. 2) 465-.
- triethylsulphine derivatives. *Nasini, R., & Costa, T.* *Rm. R. Ac. Linc. Rd.* 6 (1890) (Sem. 2) 284-.
- Refractometer, and experiments with solutions. *Hallwachs, W.* *Dresden Isis Sb.* (1898) (Ab.) 49-.
- Tautomerism. *Brühl, J. W.* *J. Pr. C.* 50 (1894) 119-.

3875 *Reflection, Refraction and Absorption of Electric Radiation.*

- (Diffraction.) *Shvedov, T. N.* (xii) *Rs. C. Ps. S. J.* 7 (Ps.) (1875) [(Pt. 1)] 101-; 8 (Ps.) (1876) [(Pt. 1)] 145-; 9 (Ps.) (1877) [(Pt. 1)] 94-.
- (Shvedov's theory.) *Khvol'son, O. D.* (xii) *Rs. C. Ps. S. J.* 7 (Ps.) (1875) [(Pt. 1)] 132-; 8 (Ps.) (1876) [(Pt. 1)] 428-.
- (Reflection.) *Shvedov, T. N.* (xii) *Rs. C. Ps. S. J.* 8 (Ps.) (1876) [(Pt. 1)] 176-.

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- anomalous, and chemical constitution. *Drude, P.* *Leip. Mth. Ps. B.* 48 (1896) 431-; *A. Ps. C.* 60 (1897) 500-.
- , theory. *Drude, P.* *Leip. Mth. Ps. B.* 49 (1897) 549-.
- of electromagnetic waves. *Righi, A.* *Rm. R. Ac. Linc. Rd.* 6 (1897) (Sem. 1) 214-.
- and emission of waves by resonance. *Planck, M.* *Berl. Ak. Sb.* (1895) 289-.
- of Röntgen rays. *Buguet, A.* *C. R.* 125 (1897) 398-.
- — —, *Humphreys, W. J.* *Ph. Mg.* 44 (1897) 401-.
- — — by air. *Trowbridge, J., & Burbank, J. E.* *Sc. Abs.* 2 (1899) 665.
- — — aqueous salt solutions. *Blythwood, (Lord), & Marchant, E. W.* *R. S. P.* 65 (1900) 413-.
- — — chemical compounds. *Gladstone, J. H., & Hibbert, W.* *C. N.* 78 (1898) 199-.
- — — gases and vapours, and electrification of gases exposed to Röntgen rays. *Rutherford, E.* *Ph. Mg.* 43 (1897) 241-.
- — — glass. *Nannes, G.* *Stockh. Öfv.* (1896) 505-.
- selective, of Röntgen rays. *McClelland, J. A.* *R. S. P.* 60 (1897) 146-.

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- of short waves by water. *Drude, P.* A. Ps. C. 65 (1896) 499-.
- transparency of bodies for Röntgen rays, law. *Benoist, L.* C. R. 124 (1897) 146-; Par. S. Ps. Sé. (1897) 21-.
- of waves by liquids. *Branly, É.* Par. S. Ps. Sé. (1900) 9-.
- — — non-metallic bodies. *Branly, É., & Le Bon, G.* C. R. 128 (1899) 879-.

Physical behaviour of substances containing hydroxyl. *Guillaume, C. É.* A. Tél. 23 (1896-97) 380-.

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- Goldstein, E.* Berl. Ak. Mb. (1881) 775-.
- diffuse, of Röntgen rays. *Pupin, M. I.* Science 3 (1896) 538-.
- — — — — *Thomson, J. J.* Camb. Ph. S. P. 9 (1898) 393-.
- of Röntgen rays. *Blythwood, (Lord).* R. S. P. 59 (1896) 330-.
- — — — — *Dwvshauvers-Dery, F. V.* Brux. Ac. Bll. 81 (1896) 482-.
- — — — — (Blythwood). *Kelvin, (Lord).* R. S. P. 59 (1896) 332-.
- — — — — *Lea, M. C.* Science 4 (1896) 917.
- — — — — *Malagoli, R., & Bonacini, C.* Rm. R. Ac. Linc. Rd. 5 (1896) (Sem. 1) 327-.
- — — — — from platinum. *Rood, O. N.* Science 3 (1896) 463-.
- — — — —, Rood's demonstration. *Mayer, A. M.* Science 3 (1896) 705-.
- — — — — polished metallic surfaces. *Rood, O. N.* Am. J. Sc. 2 (1896) 173-.
- total. *Bose, J. C.* R. S. P. 62 (1898) 300-.

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- Guéroul, A.* Lum. Élect. 4 (*1881) 330-.
- Dispersion. *Marx, E.* A. Ps. C. 66 (1898) 411-, 597-.
- — — — — *Graetz, L., & Fomm, L.* A. Ps. C. 66 (1898) 1196-.
- — — — —, anomalous, of fluids. *Drude, P.* Leip. Mth. Ps. Ab. 23 (1897) 1-.
- — — — —, theory. *Drude, P.* Leip. Mth. Ps. B. 49 (1897) 549-.
- — — — — in glasses, organic acids and esters. *Lüwe, K. F.* A. Ps. C. 66 (1898) 390-, 582-.
- Double refraction. *Mack, K.* A. Ps. C. 54 (1895) 342-.
- — — — — (Mack). *Bezold, W. von.* A. Ps. C. 54 (1895) 752-.
- — — — — *Right, A.* A. Ps. C. 55 (1895) 389-.
- — — — — *Lebedev, P.* Rs. Ps.-C. S. J. 27 (Ps.) (1895) 218-; A. Ps. C. 56 (1895) 1-.
- — — — — *Mack, K.* A. Ps. C. 56 (1895) 717-.
- — — — —, dielectric. *Blondlot, R.* J. de Ps. 7 (1888) 91-.
- — — — — of wood for electromagnetic waves. *Mazzotto, D.* Rm. R. Ac. Linc. Rd. 6 (1897) (Sem. 2) 73-.

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- Refractive indices of glass. *Bose, J. C.* B. S. P. 62 (1898) 293-.
- — — — — gypsum for electromagnetic waves. *Right, A.* Rm. R. Ac. Linc. Rd. 6 (1897) (Sem. 1) 324-.
- — — — — liquids for waves, method of demonstration. *Drude, P.* Leip. Mth. Ps. B. 47 (1895) 329-.
- — — — — for short waves. *Lampa, A.* Wien Ak. Sb. 105 (1896) (Ab. 2a) 587-, 1049-.
- — — — — of water. *Ellinger, H. O. G.* A. Ps. C. 46 (1892) 513-, 680.
- — — — — and aqueous solutions. *Drude, P.* Leip. Mth. Ps. B. 48 (1896) 315-.
- — — — — for waves 2 metres to 25 centimetres in length. *Mazzotto, D.* Rm. R. Ac. Linc. Rd. 5 (1896) (Sem. 2) 301-.
- Röntgen rays. *Beaulard, F.* C. R. 122 (1896) 782.
- — — — — in prism. *Hurion, —, & Izarn, —.* C. R. 122 (1896) 1195-.
- — — — —, refraction and diffraction. *Gouy, —.* C. R. 122 (1896) 1197-; 123 (1896) 43-; J. de Ps. 5 (1896) 345-.
- — — — —, reflection. *Evans, W. P.* [1896] N. Z. I. T. 29 (1897) 573-.

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(See also Mineralogy 400-440.)

4000 General. Instruments and Methods.

- Mayer, J. T.* [1812] Gött. Cm. 2 (1811-13) 43 pp.
- Muncke, G. W.* Gilbert A. 57 (1817) 203-.
- Schweigger, J. S. C.* Schweigger J. 21 (1817) 113-.
- Biot, J. B.* Par. S. Phlm. Bll. (1818) 143.
- Muncke, G. W.* Gilbert A. 66 (1820) 412-.
- Anon.* (vi 607) Gleanings Sc. 2 (1830) 105-.
- Arago, D. F. J.* Par. Bur. Long. An. (1831) 151-.
- Delezenne, —.* Lille Mm. S. (1834) 283-, 594-; (1835) 5-.
- Spottiswoode, W.* [1873-74] (xi) Nt. 9 (1874) 127-, 167-, 203-, 282-, 323-, 383-, 464-, 507-; 10 (1874) 125-.
- Depolarisation. *Dove, H. W.* Pogg. A. 71 (1847) 115-.
- — — — — *Kundt, A.* A. Ps. C. 123 (1864) 385-.
- — — — — by various bodies. *Brewster, (Sir) D.* [1814] Phil. Trans. (1815) 29-.
- — — — — in traversing crystal, apparent. *Péchar-dergne, —.* [1859] (viii) Bordeaux Mm. S. Sc. 4 (cah. 2) (1866) 102-.
- Depolarised light, distinction from natural light. *Poggendorff, J. C.* Pogg. A. 85 (1835) 448-.
- Experiment. *Airy, (Sir) G. B.* (vi Add.) Ph. Mg. 10 (1831) 141-.
- — — — —, Huygens's, applications. *Stroumbo, S.* Les Mondes 34 (1874) 562-.

- Experiments. *Haldat du Lys*, C. N. A. de.
Nancy Mm. S. Sc. (1837) 83-.
— (with quartz, etc.). *Babinet*, J. C. R. 8
(1839) 762.
—, *Rosenbach*, —. Bresl. Schl. Gs. Jbr.
(1893) (*Ab. 2a*) 17-.
—, *Hintze*, —. Bresl. Schl. Gs. Jbr. (1893)
(*Ab. 2a*) 19-.
—, *fundamental*. *König*, W. Frkf. a. M. Ps.
Vr. Jbr. (1892-93) 26-.
Indicatrix, optical, and transmission of light
in crystals. *Fletcher*, L. [1891] Mn. Mg.
9 (1892) 278-; [404].

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- Apparatus. *Bruhns, G.* Z. V. r. D. Zuckin. 49 (1899) (Th. 2.) 452-.
- for crystals. *Schneider, E.* Carl Rpm. 15 (1879) 744-.
- with 2 division lines in field of sight. *Frīč, Jo., & Frīč, Ja.* Z. Zuckin. Böhm. 18 (1893-94) 822-.
- for elliptically polarised light. *Dove, H. W.* B. A. Rp. (1854) (pt. 2) 9.
- experiments. *Schulze-Montanus, —.* Gilbert A. 56 (1817) 427-.
- —. *Umov, —.* Par. S. Ps. Sé. (1899) 25*.
- with glass scale, new. *Frīč, Jo., & Frīč, Ja.* Z. Zuckin. Böhm. 23 (1898-99) 501-.
- , Heele's new. *Gumlich, E.* Z. Instk. 16 (1896) 269-, 352.
- , magnesiumplatinocyanide. *Lommel, E. C. J.* Erlang. Ps. Md. S. Sb. 13 (1881) 81-.
- , modified. *Reusch, F. E.* Pogg. A. 92 (1854) 336.
- , Nörremberg's, modification. *Schinz, E.* Sch. Gs. Vh. (1846) 38-.
- , novelties in. *Wicke, W.* Mer. S. J. (1898) 233-.
- for plane, elliptic and circular polarisation. *Dove, H. W.* Pogg. A. 35 (1835) 596-.
- — polarised light, without Iceland spar. *Cheyney, J. S.* Mer. S. J. (1900) 719-.
- , simple form. *Cook, J.* Nt. 60 (1899) 8.
- Axes of doubly refracting crystals, arrangement for distinguishing. *Sorby, H. C.* M. Mer. J. 18 (1877) 209-.
- Colorimeter, polarisation-. *Krüß, H.* Z. Ps. C. 10 (1892) 165-.
- Compensation of optical difference of path. *Sirks, J. L.* A. Ps. C. 140 (1870) 621-; 141 (1870) 393-.
- Compensator, Babinet, construction. *Schmidt, K. E. F.* Z. Instk. 11 (1891) 439-; 12 (1892) 80; A. Ps. C. 45 (1892) 377-.
- , theory. *Schmidt, K. E. F.* A. Ps. C. 35 (1888) 360-.
- for polarimetry. *Wulff, G. V.* Rs. Ps.-C. S. J. 20 (Ps.) (1888) 20-; J. de Ps. 8 (1889) 535-.
- Dichroiscope. *Haidinger, W.* Wien SB. (1848) 70-.
- , *Dove, H. W.* Pogg. A. 110 (1860) 265-.
- , improvement. *Cathrein, A.* Z. Instk. 16 (1896) 225-.
- , *Sorby's. Anon.* Mer. S. J. 5 (1885) 121-.

- Double-rotation apparatus, optical properties. *Biot*, J. B. C. R. 21 (1845) 453-.
- Elliptic polarisation of light reflected from metals, instrument for measuring. *MacCullagh*, J. [1838] Ir. Ac. P. 1 (1836-40) 158-.
- Gratings, polarising. *Du Bois*, H. E. J. G. B. A. Rp. (1892) 660.
- Lenses and systems of lenses for observation of coloured rings in polarised light. *Reusch*, F. E. (vi Add.) D. Nf. Vsm. B. 34 (1858) 160-.
- Leukoscope. *Brodhun*, E. A. Ps. C. 34 (1888) 897-.
- Microscope, arrangement to shew axial images of doubly refracting bodies. *Dippel*, L. Z. Ws. Mkr. 17 (1900) 145-.
- , — rings of crystals. *Stone*, W. H. L. Ps. S. P. 1 (1876) 34-; Ph. Mg. 48 (1874) 138.
- , polarisation, for axial angles. *Schneider*, E. Carl Rpm. 15 (1879) 119-.
- , —, and determination of character of double refraction. *Klein*, C. Berl. Ak. Sb. (1893) 221-.
- , —, Nörremberg's. *Bertin*, A. A. C. 69 (1863) 87-.
- , —. *Brezina*, A. A. Ps. C. 128 (1866) 446-.
- , polarising apparatus for. *Thompson*, S. P. Mcr. S. J. (1889) 617-.
- Photometer and polarimeter, new. *Wild*, H. Pogg. A. 99 (1856) 235-; Bern Mt. (1859) 24-; Sch. Gs. Vh. 46 (1862) 107-.
- , polarisation-, for technical purposes, examination of Wenham gas lamps. *Wild*, H. [1887] St. Pé. Ac. Sc. Mm. (*Rs.*) 63 (1890) (*App. No.* 1) 31 pp.; St. Pé. Ac. Sc. Bll. 32 (1888) 193-.
- , —, —, simplification. *Wild*, H. [1888] St. Pé. Ac. Sc. Bll. 33 (1890) 5-.
- Plate, Bravais, use. *Cotton*, A. A. C. 8 (1896) 433-.
- Plates, amethyst, use. *Brewster*, (Sir) D. B. A. Rp. (1858) (*pt.* 2) 13.
- , quartz, method of determining whether inclined to optic axis or not. *Soleil*, H. C. R. 41 (1855) 669-.
- , —, —, —, —, — (Soleil). *Senarmont*, H. de. A. C. 46 (1856) 89-.
- , —, polished, method of testing. *Dongier*, R. Par. S. Fs. Sé. (1898) 104-.
- , —, testing parallelism. *Brunhes*, B. Par. S. Fs. Sé. (1893) 206-.

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- Brewster, (Sir) D. [1841-42] R. S. P. 4
(1841) 306-; Ir. Ac. T. 19 (1843) 377-.
Righi, A. Bologna Ac. Sc. Mm. 6 (1884)
599-.
Damien, B. C. Bll. Sc. Nord 16 (1884-85)
169-.
Pickering, E. C. Am. Ac. P. 21 (1886) 294-.
Frič, Jo. Z. Zuckin. Böhm. 17 (1892-93)
7-.
comparability of measurements. Lippich, F.
Z. Instk. 12 (1892) 333-.

- comparison of forms. *Damien, B. C.* (xii) *Bll. Sc. Nord* 15 (1883) 221-.
- cover glasses for, method of examination. *Frü, Jo., & Frü, Ja.* *Z. Zuckin. Böhm.* 16 (1891-92) 307-.
- half-shadow. *Lippich, F.* (xii) *Lotos* 30 (1882) 45-.
- field in, by 2 inclined glass plates. *Poynting, J. H. B. A. Rp.* (1899) 662-.
- , improvement. *Lippich, F.* *Z. Instk.* 14 (1894) 326-, 420.
- , theory. *Lippich, F.* *Wien Ak. Sb.* 99 (1891) (*Ab. 2a*) 695-.
- , use of photography with. *Chauvin, —, & Fabre, C. C. R.* 113 (1891) 691-.
- improvements. *Frü, Jo., & Frü, Ja.* *Z. Zuckin. Böhm.* 17 (1892-93) 551-.
- lighting arrangements for. *Martens, F. F.* *Z. Instk.* 18 (1898) 335-.
- for ordinary light. *Laurent, L.* *Par. S. Ps. Sé.* (1882) 146-; *C. R.* 94 (1882) 442-.
- photopolarimeter. *Cornu, A.* *As. Fr. C. R.* 11 (1882) 253-.
- for rotatory polarising liquids. *Steeg, —, & Reuter, —.* *Z. Instk.* 8 (1888) 427-.
- scale, apparatus for lighting. *Schneider, H. Z. Zuckin. Böhm.* 14 (1889-90) 219-.
- sodium light replaced by light filter for polarimetric work. *Landolt, H.* *Phm. Z. Russl.* 33 (1894) 773-.
- spectropolarimeter. *Fleischl, E. von. Exner Rpm.* 21 (1885) 323-.
- tube. *Hanus, F.* *Z. Zuckin. Böhm.* 18 (1893-94) 14-.
- tubes, porcelain. *Müller, M.* *Z. Angew. C.* (1888) 251-.
- twin prisms for. *Thompson, S. P.* *Ph. Mg.* 24 (1887) 397-.
- vertical. *Schmidt, F., & Hänsch, —.* *Z. Instk.* 5 (1885) 61-.
- yellow light for polarimetric observations. *Dupont, F. A. C. Anal.* 2 (1897) 267-.

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- Brooke, H. J.* *Silliman J.* 15 (1829) 369-.
- Amici, G. B. A. C.* 12 (1844) 114-.
- Bryson, A.* *Edinb. N. Ph. J.* 48 (1850) 19-.
- Senarmont, H. de. A. C.* 28 (1850) 279-.
- Bravais, A.* [1851] *C. R.* 32 (1851) 112-; *A. C.* 43 (1855) 129-.
- Adams, W. G. L. Ps. S. P.* 1 (1876) 152-; *Ph. Mg.* 50 (1875) 13-; *B. A. Rp.* (1878) 486.
- acetylene as illuminant. *Wiley, H. W. Am. C. S. J.* 18 (1896) 179-.
- adapted to sky observations. *Bosanquet, R. H. M. Ph. Mg.* 2 (1876) 20-.
- analyser. *Airy, G. B.* [1832] *Camb. Ph. S. T.* 4 (1833) 313-.
- and crystalline plate, apparatus to measure planes of polarisation. *Laurent, L. Par. S. Ps. Sé.* (1881) 278-.
- , elliptic. *Stokes, G. G. B. A. Rp.* (1851) (*pt. 2*) 14-.
- , half-shadow. *Macé de Lépinay, J. C. R.* 131 (1900) 832-.
- , rotating. *Mach, E. A. Ps. C.* 156 (1875) 169-.

- Arago's, modification. *Pohl, J. J. Dingler* 163 (1862) 433-.
- for demonstration. *Lasaulx, A. C. P. F. von. N. Jb. Mn.* (1878) 509-.
- direct reflecting. *Hall, T. P. Science* 19 (1892) 323.
- measuring. *Adams, W. G. L. Ps. S. P.* 3 (1880) 112-; *Ph. Mg.* 8 (1879) 275-.
- natural. *Silliman, B. (jun.) Silliman J.* 47 (1844) 418.
- objects. *Spottiswoode, W. Nt.* 15 (1877) 275-.
- pocket, oleomargariscope. *Taylor, T. Am. S. Mer. P.* 10 (1888) 159-.
- polariser. *Wheatstone, (Sir) C. R. S. P.* 19 (1871) 381-.
- , *Glan, P. Carl Rpm.* 16 (1880) 570-; 17 (1881) 195.
- , *Thompson, S. P. Nt.* 44 (1891) 455.
- , *Amici, Madan, H. G. Mer. S. J.* 6 (1886) 682-.
- , half-shadow, tripartite. *Lippich, F. Wien Ak. Sb.* 105 (1896) (*Ab. 2a*) 317-.
- , Iceland spar. *Foucault, L. C. R.* 45 (1857) 238-.
- in spar of small thickness. *Joubin, —.* *Par. S. Ps. Sé.* (1897) 59*-.
- polarisers, double refraction. *Dove, H. W. Sch. Nf. Gs. Vh.* 48 (1864) 49.
- reflecting and direct acting, for arc light projector. *Knipe, O. Science* 22 (1893) 272.
- revolving. *Spottiswoode, W. Ph. Mg.* 49 (1875) 472-.
- simple. *Baumgartner, A. von. Baumgartner Z.* 1 (1826) 33-.
- table-, Spottiswoode's combination with. *Tisley, S. C. B. A. Rp.* (1874) (*Sec.*) 26-.
- Polarised light, compensations. *Brewster, (Sir) D.* [1841-42] *R. S. P.* 4 (1841) 306-; *Ir. Ac. T.* 19 (1843) 377-.
- , demonstration of properties, method. *Umov, N. Z. Ps. C.* 30 (1899) 711-; *A. Ps.* 2 (1900) 72-.

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- analysing. *Jellett, J. H. NH. Rv.* 7 (1860) (*P.*) 503-.
- Bertrand's idioeyclopheanous spar-prism. *Madan, H. G. Nt.* 42 (1890) 52-.
- doubly refracting (as polariser). *Senarmont, H. de. A. C.* 50 (1857) 480-.
- , for determination of elliptic axes. *Jan-nettaz, É. C. R.* 78 (1874) 413-.

Polarising Prisms.

- Dove, H. W. Berl. Mb.* (1864) 42.
- Hartnack, —, & Prazmowski, —.* *Carl Rpm.* 1 (1866) 325-; 2 (1867) 217-.
- (*Hartnack & Prazmowski's*) *Deleuil, —. C. R.* 62 (1866) 149-.
- Jamin, J. C. R.* 68 (1869) 221.
- Thompson, S. P. Ph. Mg.* 12 (1881) 349-.
- Glazebrook, R. T. L. Ps. S. P.* 5 (1894) 204-.
- Ph. Mg.* 15 (1883) 352-.
- Ahrens, C. D. Mer. S. J.* 4 (1884) 533-.
- Feussner, K. Z. Instk.* 4 (1884) 41-.

- (Ahrens's.) *Thompson, S. P. B. A. Rp.* (1885) 912.
Ahrens, C. D. Mer. S. J. 6 (1886) 397-, 859.
 (Ahrens's.) *Schröder, H. Z. Instk. 6* (1886) 310-.
Thompson, S. P. Ph. Mg. 21 (1886) 476-;
Par. S. Ps. Sé. (1887) 100-.
Grosse, —. D. Nf. Vh. (1890) (Th. 2) 33-.
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 Foucault's and Ahrens's, modification. *Madan, H. G. Nt. 31* (1885) 371-.
Nicol. Nicol, W. Edinb. N. Ph. J. 6 (1829) 83-.
 —. *Talbot, W. H. F. (vi Add.) Ph. Mg. 4* (1834) 289-.
 —. *Spassky, M. Pogg. A. 44* (1838) 168-.
 —. *Nicol, W. Edinb. N. Ph. J. 27* (1839) 332-.
 —. *Talbot, W. H. F. [1871] Edinb. R. S. P. 7* (1872) 468-.
 —. *Glazebrook, R. T. Ph. Mg. 10* (1880) 247-.
 —, of calcite and glass. *Leiss, C. Berl. Ak. Sb. (1897) 901-*.
 —, — — —. *Lommel, E. von. [1898] Münch. Ak. Sb. 28* (1899) 111-.
 —, exact orientation of principal section. *Laurent, L. C. R. 86* (1878) 662-.
 — and Foucault, manufacture. *Laurent, L. C. R. 102* (1886) 1012-; *Par. S. Ps. Sé. (1886) 109-*.
 —, improvement. *Radicke, G. Pogg. A. 50* (1840) 25-.
 —. *Hasert, B. Pogg. A. 113* (1861) 189-.
 —, large. *Ahrens, C. D. [1899] Nt. 61* (1899-1900) 31-.
 —, modification giving wider angle of field. *Thompson, S. P. B. A. Rp. (1885) 912*.
 —, principle. *Potter, R. Ph. Mg. 14* (1857) 452-.
 —, use. *McConnel, J. C. L. Ps. S. P. 7* (1886) 22-; *Ph. Mg. 19* (1885) 317-.
 —, in polarisation measurements. *Cornu, A. (ix) Par. S. Phlm. Bll. 4* (1867) 5-.
 silvered, for successive polarisation. *Stephenson, J. W. M. Mer. J. 7* (1872) 246-.
 sulphur, for infra-red rays. *Uljanin, V. Kazan Un. Mm. (1899) (Pts. 7 & 8) 185-*; *Fschr. Ps. (1899) (Ab. 2) 42*.
 with wide field and transverse faces. *Bertrand, E. C. R. 99* (1884) 538-.
- Projection apparatus, Duboseq. *Bertin, A. Par. S. Ps. Sé. (1874) 62-*.
 — for examination of rock slices by polarised light. *Pellin, P. As. Fr. C. R. (1897) (Pt. 1) 197-*.
 —, Soleil's, modification. *Lovering, J. Am. As. P. (1853) 24-*.
 —, crystallographic, optical bench for. *Grattarola, G. Rv. Sc. Ind. 29* (1897) 1-.
- Refractive indices, determination by angle of polarisation. *Pfaff, (Dr.) P. A. Ps. C. 127* (1866) 150-.

- Refractive indices, determination by angle of polarisation (Pfaff). *Des Cloizeaux, A. A. Ps. C. 129* (1866) 479-.
- Refractor, differential, for polarised light. *Jamin, J. C. R. 67* (1868) 814-.
- Resultant vibrations in polarised light, instrument to illustrate. *Snell, E. S. Silliman J. 32* (1861) 376-.
- Rotatory polarisation experiments, apparatus for measuring deviations. *Soleil, —. C. R. 21* (*1845) 426-.
- — — — —, Soleil's. *Biot, J. B. C. R. 21* (1845) 428-.
- — —, method of facilitating. *Soleil, —. C. R. 20* (1845) 1805-.
- in liquids, apparatus. *Powell, B. Ph. Mg. 22* (1843) 241-.
- power, apparatus for measuring. *Cornu, A. Par. Bll. S. C. 14* (1870) 140-.
- — — and methods for measuring. *Biot, J. B. C. R. 20* (1845) 1747-.
- of liquids, apparatus for observing. *Biot, J. B. C. R. 11* (1840) 413-.
- — — quartz, apparatus and method for measuring. *Broch, O. J. A. C. 34* (1852) 119-.

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- Soleil, —. C. R. 24* (1847) 973-.
- Hendry, W. J. Mer. Sc. 8* (1860) 248-.
- Jellett, J. H. [1863] Ir. Ac. P. 8* (1864) 279-.
- Laurent, L. Par. S. Ps. Sé. (1874) 7-*.
- Trannin, H. As. Fr. C. R. (1885) (Pt. 1) 105*.
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- fringe, for white light. *Duboseq, T., & Duboseq, A. Par. S. Ps. Sé. (1886) 64-*.
- Laurent, Laurent, L. C. R. 89* (1879) 665-.
- white-light. *Dufet, H. J. de Ps. 1* (1882) 552-.
- and means of rendering sodium flame absolutely monochromatic. *Laurent, L. C. R. 78* (1874) 349-.
- Mitscherlich's. *Schwoippel, C. Brünn Vh. 2* (1863) 72-.
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- or polarimeter, measurement of electric current. *Arsonval, — d'. Par. S. Ps. Sé. (1890) 108-*.
- polaristobrometer. *Wild, H. I. [1864-69] Bern Mt. (1864) 27-*; *St. Pet. Ac. Sc. Mm. (Rs.) 16* (*1870) 141-; *St. Pét. Ac. Sc. Bll. 14* (1870) 149-.
- , improvements. *Wild, H. Zür. Vjschr. 43* (1898) 57-; *Arch. Sc. Ps. Nt. 6* (1898) 379-.
- and rotating Nicol, theory. *Sande-Bakhuyzen, H. G. van de. [1871] A. Ps. C. 145* (1872) 259-.
- with white light. *Wild, H. I. St. Pét. Ac. Sc. Bll. 28* (1863) 407-.
- — — — —, absolute measurements by polaristobrometer. *Wild, H. Zür. Vjschr. 44* (1899) 136-.

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—, half-shadow apparatus. *Lippich, F.* Wien Ak. Sb. 91 (1885) (Ab. 2) 1059-.

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Soleil's, degree of accuracy. *Boltshauser, G. A.*

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Spectroscopic and polarising apparatus, combination. *Lang, V. (Ritter) von.* (xii) Z. Kr. 2 (1878) 492-.

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—, von Kobell's. *Haidinger, W.* Wien Sb. 15 (1855) 351-.

—, modification. *Brezina, A. A. Ps. C.* 128 (1866) 446-.

—, — (Brezina). *Kobell, F. von.* A. Ps. C. 129 (1866) 478-.

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— and other optical experiments. *Rood, O. N.* Silliman J. 27 (1859) 391-.

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—, twin. *Grailich, W. J.* Wien SB. 11 (1854) 817-; 12 (1854) 230-.

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— and unannealed glass under polariscope. *Baily, W.* [1878] L. Ps. S. P. 3 (1880) 1-; Ph. Mg. 7 (1879) 39-.

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- , *Quincke*, G. A. Ps. C. 149 (1873) 273-; 47 (1892) 765-.
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- in optical telegraphy, use. *Ellie*, R. Bordeaux S. Sc. Mm. 4 (1888) 359-; 5 (1890) xcr-.
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- — — *Neumann, F. E.* Pogg. A. 26 (1832) 89-.
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- — — *Powell, B.* Phil. Trans. (1845) 269-.
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- — — *Quincke, G. A. Ps. C. 128 (1866) 541-.*
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- Schmidt, K. E. F.* Berl. Ak. Sb. (1893) 1041-; A. Ps. C. 51 (1894) 417-; 52 (1894) 75-.
- Drude, P. A. Ps. C. 53 (1894) 69-.*
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- Lamellar polarisation. *Biot, J. B. C. R. 12 (1841) 967-; 13 (1841) 391-; Par. Ac. Sc. Mm. 18 (1842) 539-.*
- — — so-called, of alum. *Reusch, E.* Berl. Mb. (1867) 424-.
- Pile of plates, intensity of light reflected from or transmitted through. *Stokes, G. G. R. S. P. 11 (1860-62) 545-.*
- — — (glass), intensity of light transmitted. *Erhard, T. A. Ps. C. 12 (1881) 655-.*
- Plates, thin, light reflected and transmitted by. *Lloyd, H.* [1859] (viii) Ir. Ac. T. 24 (1871) 3-.
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- — — by crystals. *Biot, J. B. C. R. 13 (1841) 155-.*
- — — diffraction. *Ezner, K.* Wien Ak. Sb. 99 (1891) (*Ab. 2a*) 761-; 101 (1892) (*Ab. 2a*) 190-; A. Ps. C. 49 (1893) 387-.
- — — *Poincaré, H.* Acta Mth. 16 (1892-93) 297-; 20 (1897) 313-.
- — — emission. *Vielle, J. C. R. 105 (1887) 111-; Par. S. Ps. Sé. (1888) 18-.*

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- Forbes, J. D.* Ph. Mg. 7 (1835) 349-; C. R. 2 (1836) 156; 6 (1838) 705-.

- Melloni, M.* C. R. 3 (1836) 133-; A. C. 61 (1836) 375-; 65 (1837) 5-; C. R. 5 (1837) 530-.
- Forbes, J. D.* [1838] Edinb. R. S. T. 14 (1840) 176-.
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- Foster, G. C.* L. Ps. S. P. 2 (1879) 143-; Ph. Mg. 3 (1877) 261-.
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- Polarisation by living animals. *Goddard, J. F.* (vi *Adds.*) Ph. Mg. 15 (1839) 152-.
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- Partial polarisation, law. *Brewster, (Sir) D.* Phil. Trans. (1830) 69-.
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- — — — — doubly refracting, application. *Wulff, L.* Z. Instk. 17 (1897) 292-.

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- Heat, polarimetry. *Desains, P., & La Provostaye, F. de.* C. R. 32 (1851) 86-; A. C. 32 (1851) 112-.
- Metals, optical properties. *Quincke, G.* Berl. Mb. (1863) 115-.
- Parallel polarised light, determination of optical character in. *Kjerulf, T.* Christiania F. (1885) No. 16, 4 pp.; Z. Kr. 15 (1889) 434.
- Phase difference of components of polarised beam, measurement. *Bouasse, —.* C. R. 111 (1890) 100-.
- Recognition of polarised light by naked eye, and position of polarisation plane. (Haidinger's brushes.) *Haidinger, W.* Pogg. A. 63 (1844) 29-.
- Rotation for Fraunhofer lines, measurement. *Lommel, E.* Münch. Ak. Sb. 18 (1889) 321-.
- — — — — measurement. *Wulff, G. V.* Rs. Ps.-C. S. J. 18 (Ps.) (1886) 123-; Fsch. Ps. (1886) (Ab. 2) 117.
- Rotatory dispersion, measurement. *Seyffart, J.* [1889] A. Ps. C. 41 (1890) 113-.
- — — — — *Landolt, H.* Berl. Ak. Sb. (1894) 923-; Berl. B. 27 (1894) 2872-.
- — — — — Case of anomalous dispersion. *Wyss, G. H. von.* A. Ps. C. 33 (1888) 554-.
- — — — — (Wyss). *Lippich, F.* A. Ps. C. 36 (1889) 767-.

4030 Rings, Brushes and Colours of Crystals, etc.

- Colour of blue steel spring in polarised light. *Willigen, V. S. M. van der.* Amst. Vs. Ak. 9 (1859) 257-.
- Colours, interference. *Arago, D. F. J.* Par. Mm. de l'I. (1811) (pte. 1) 93-.
- — — — — due to polarisation. *Mayer, J. T.* Gött. Cm. 3 (1814-15) 77-.
- — — — — influence of heat. *Fresnel, A. J.* A. C. 4 (1817) 298-.
- — — — — of thin æolotropic plates in parallel polarised light. *Viola, C.* Rm. R. Ac. Linc. Rd. 4 (1888) (Sem. 1) 19-.
- — — — — plates in polarised light. *Brewster, (Sir) D.* Phil. Trans. (1841) 43-.
- — — — — *Lloyd, H.* [1841] Ir. Ao. P. 2 (1840-44) 266-.

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- Brezina, A.* Wien Sb. 60 (1870) 891-.
- Aragonite and calcspar.* *Brewster, (Sir) D.* Q. J. Sc. 4 (1818) 112-.
- — — — — epoptic figures without preliminary polarisation. *Erman, P.* Berl. Ab. (1832) 1-.
- Augite, colours in polarised light.* *Bütschli, O.* N. Jb. Mn. (1867) 700-.

4030 *Biaxial Crystals* Rings, Brushes, Colours of Crystals, etc. 4030

- Axial cross from projection of isometric axes. *Moses, A. J.* Sch. Mines Q. N. Y. 15 (1894) 214-.
- images. *König, W.* Frkf. a. M. Ps. Vr. Jbr. (1892-93) 23-.
- in convergent light, in alum, lead nitrate, gelatin and quickly cooled glass. *Klocke, F.* [1882] Freiburg B. 8 (*1885) 48-.
- Belemnites, action on polarised light. *Jamin, J.* C. R. 18 (1844) 680-.
- Beryl and other crystals in polarised light. *Salm-Horstmar, W. F.* (Fürst zu). Pogg. A. 84 (1851) 515-.
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- black cross in, solution of geometrical problem. *E., J.* (vi Adds.) Ph. Mg. 19 (1841) 305-.
- chromatic polarisation of brushes in. *Macé de Lépinay, J.* J. de Ps. 6 (1877) 16-.
- depolarisation of light near axes. *Carvalho, E.* J. de Ps. 4 (1895) 312-.
- elliptical ring system in mica. *Kohlmann, —.* (vi Adds.) Halle Jbr. NW. Vr. 5 (1852) 9-.
- hyperbolic brushes. *Müller, (Dr.) J.* Pogg. A. 44 (1838) 273-.
- , *Kurz, A.* Z. Mth. Ps. 15 (1870) 209-.
- Ohm's ellipses produced by. *Madan, H. G.* Nt. 32 (1885) 414-.
- phenomena in circularly polarised light. *Dove, H. W.* Pogg. A. 40 (1837) 482-.
- plates, interference phenomena in homogeneous polarised light. *Lommel, E.* Pogg. A. 120 (1863) 69-.
- pleochroic, absorption brushes in. *Voigt, W.* Gött. Nr. (1896) 252-.
- ring system. *Zech, P.* Pogg. A. 97 (1856) 129-; 102 (1857) 354-.
- rings and brushes in cupric formate. *Müller, (Dr) J.* Pogg. A. 35 (1835) 472-.
- , —, spectra produced by. *Thomson, (Sir) W.* Camb. and Dubl. Mth. J. 1 (1846) 124-.
- Borax. *Talbot, W. H. F.* C. R. 2 (1836) 472-.
- , rings. *Herschel, (Sir) J. F. W.* Quetelet Cor. Mth. 7 (1832) 77-.
- Calcspar and beryl with cavities containing fluid, optical properties. *Brewster, (Sir) D.* Ph. Mg. 33 (1848) 489-.
- , rings caused by fine canals in. *Schmidt, K. E. F.* A. Ps. C. 33 (1888) 534-.
- , in fibrous specimens. *Stoney, G. J.* Ir. Ac. T. 24 (1860) (pt. 1) 31-.
- , — some specimens. *Brewster, (Sir) D.* B. A. Rp. (1844) (pt. 2) 9.
- Chromatic polarisation, phenomena. *Mallard, E.* (xii) Fr. S. Mn. Bil. 4 (1881) 66-.
- Circularly polarised light, phenomena in. *Spottiswoode, W.* R. I. P. 6 (1872) 506-.
- , —, rings in. *Spottiswoode, W.* R. S. P. 20 (1872) 333-.
- Crystalline plates. *Lommel, E.* Z. Mth. Ps. 12 (1867) 514-.
- , colours. *Spottiswoode, W.* R. I. P. 7 (1873) 134-.
- , —, in elliptically polarised light. *Bertin, A.* A. C. 18 (1879) 495-.
- Crystalline plates, colours in polarised light. *Abria, O.* Bordeaux Mm. S. Sc. 8 (1870) 59-.
- , effect on ray of light. *Mascart, —.* C. R. 105 (1887) 536-.
- , perpendicular to axis, interference phenomena. *Ketteler, E.* A. Ps. C. 11 (1880) 496-.
- , phase differences produced by, and construction of quarter wave and half wave plates. *Right, A.* Rm. R. Ac. Linc. Rd. 1 (1892) (Sem. 1) 189-.
- , rings in polarised light. *Marbach, H.* Bresl. Schl. Gs. Übs. (1845) 90-.
- , thin, colours. *Fresnel, A. J.* A. C. 17 (1821) 102-, 167-, 312-.
- , —, —. *Biot, J. B.* A. C. 17 (1821) 225-.
- , —, —. *Ditscheiner, L.* Wien Ak. Sb. 73 (1876) (Ab. 2) 180-.
- Doubly refracting crystals, absorption of polarised light by. *Brewster, (Sir) D.* [1818] Phil. Trans. (1819) 11-.
- , —, chromatic polarisation in. *Basso, G.* [1880] Tor. Ac. Sc. Mm. 34 (1883) 3-.
- , —, curves of equal illumination in axial images. *Lommel, E.* Münch. Ak. Sb. 19 (1890) 317-.
- , —, isogyral surfaces. *Pitsch, H.* Wien Ak. Sb. 91 (1885) (Ab. 2) 527-.
- , —, spectra formed by passage of polarised light through. *Deas, F.* [1870] Edinb. R. S. T. 26 (1872) 177-.
- , —, —, —, —, —, — (Deas). *Maxwell, J. C.* Edinb. R. S. T. 26 (1872) 185-.
- Equations in theory of polarisation. *Gruzintsev, A. P.* (xii) Kharkov Mth. S. Com. (1882) 124-.
- Gypsum, colours of thin plates in polarised light. *Jonquière, A.* Bern Mt. (1885) (Heft 1) 61-.
- , complementary colours in polarised light. *Kobell, W. F. X. (Ritter) von.* Münch. Ak. Sb. 6 (1876) 206-.
- , rings produced by pressure, relation to coefficient of elasticity. *Jannettaz, É.* C. R. 82 (1876) 839-.
- Hyposulphates, optical properties. *Marx, C. M.* Schweigger J. 47 (=Jb. 17) (1826) 236-.
- Ice, colours by polarised light. *Förstemann, W. A.* Gilbert A. 76 (1824) 76-.
- Interference brushes. *Bertin, A.* A. C. 57 (1859) 257-; C. R. 48 (1859) 458-.
- experiments with double-quartz of Soleil. *Stefan, J.* Wien Sb. 53 (1866) (Ab. 2) 548-; 66 (1872) (Ab. 2) 425-.
- Isochromatic curves. *Abria, O.* J. de Ps. 1 (1872) 273-, 326-.
- in uni- and bi-axial crystals, form. *Marx, C. M.* Schweigger J. 49 (=Jb. 19) (1827) 167-.
- surface: brushes of crystalline plates. *Bertin, A.* A. C. 63 (1861) 57-; C. R. 52 (1861) 1213-.
- Magnesium platinoeyanide in polarised light. *Lommel, E. C. J.* Erlang. Ps. Md. S. Sb. 12 (1880) 33-.

- Mica combination. *Reusch, E.* Berl. Mb. (1869) 530-.
- , Reusch's, and polarised light. *Willigen, V. S. M. van der.* [1871] Amst. Vs. Ak. 6 (1872) 147-.
- , —, rotation of crystals. *Sohncke, L.* D. Nf. Tbl. (*1875) 52-; A. Ps. C. (*Ergänz.*) 8 (1878) 16-.
- , films, colours in polarised light, artificial imitation. *Biot, J. B.* Par. S. Phlm. Bll. (1815) 176-.
- , —, optical combinations. *Wright, L. L.* Ps. S. P. 5 (1884) 186-; Ph. Mg. 15 (1883) 301-.
- , —, and wedges for use in polarisation. *Wright, L.* Ph. Mg. 16 (1883) 109-.
- , and gypsum, optical combinations. [*Bertin, A. non*] *Nörremberg, —.* A. C. 20 (1870) 215.
- , new figure in, and other phenomena of polarised light. *Page, C. G.* Silliman J. 11 (1851) 89-.
- Monochromatic light, application. (A nocturne in black and yellow.) *Spottiswoode, W.* [1878] R. I. P. 8 (1879) 582-.
- Optical angle. *Lane, A. C.* Science 20 (1892) 354-.
- Photography, application. (Figures of thin slices of crystals in polariscope.) *Crookes, W.* [1853] Pht. S. J. 1 (1854) 70-.
- , —, (Cause of occurrence of abnormal figures in impressions of polarised rings.) *Stokes, G. G.* Ph. Mg. 6 (1853) 107-.
- , of brushes. *Mascart, —, & Bouasse, —.* C. R. 111 (1890) 83-.
- Pleochroic crystals, brushes. *Bertin, A.* Par. S. Ps. Sé. (1879) 62-.
- Pleochroism, artificial production. *Senarmont, H. de.* A. C. 41 (1854) 319-; C. R. 38 (1854) 101-.
- , —, (Senarmont's coloured crystals.) *Haidinger, W.* Wien SB. 12 (1854) 400-.
- Quartz, measurement of dark rings. *McConnel, J. C.* [1883] Camb. Ph. S. P. 5 (*1886) 53-.
- Rings. *Jamin, J.* C. R. 35 (1852) 14-; A. C. 36 (1852) 158-.
- , and brushes. *Niven, W. D.* QJ. Mth. 13 (1875) 172-.
- , —, *Nelson, E. M.* Mer. S. J. (1892) 683-.
- , measurement of angle of optic axes by. *Grailich, W. J.* Wien SB. 9 (1852) 934-.
- , sizes. *Mütrich, A.* A. Ps. C. 121 (1864) 206-.
- , —, Mütrich's formula. *Hockauf, J. Z.* Kr. 18 (1891) 70-.
- , in twin crystals. *Dove, H. W.* Berl. Mb. (1864) 239-.
- Spiral figures illustrating relation of optic axes. *Wright, L.* [1881] L. Ps. S. P. 5 (1884) 1-; Ph. Mg. 13 (1882) 20-.
- cut at right angles to axis, curves of constant intensity of polarised light in. *Spurge, C.* [1884] Camb. Ph. S. T. 14 (1889) 63-.
- , —, —, isochromatic curves. *Glazebrook, R. T.* Camb. Ph. S. P. 4 (1883) 299-.
- deviations in colours from Newton's scale. *Herschel, (Sir) J. F. W.* [1819-20] Phil. Trans. (1820) 45-; Camb. Ph. S. T. 1 (1822) 21-.
- interference of polarised light in, and isochromatic curves. *Langberg, C.* N. Mg. Ntvd. 2 (1840) 53-, 103-; Pogg. A. (*Ergänz.*) 51 (1842) 529-.
- plates, explanation of rings in polarised light with Fresnel's parallelepiped. *Pscheidl, W.* A. Ps. C. (*Ergänz.*) 8 (1878) 497-.
- , interference phenomena in. *Ohm, G. S.* Münch. Ab. 7 (1855) 41-, 265-.
- , polarisation colours. *Bertin, —.* A. C. 2 (1884) 485-.
- , projection of monochromatic brushes. *Bertin, A.* Par. S. Ps. Sé. (1883) 43-.
- , twin, interference phenomena. *Pockels, F.* Gött. Nr. (1890) 259-.
- transmission of polarised light through. *Russell, W. H. L.* Nt. 2 (1870) 299-.
- tufts and brushes. *Bertrand, É.* J. de Ps. 8 (1879) 227-.
- Glass, appearance of black cross not caused by sudden cooling. *Spittiger, D. C.* Pogg. A. 79 (1850) 297-.
- , compressed, chromatic polarisation by. *Wertheim, G. C.* R. 32 (1851) 289-.
- , —, polarisation in. *Brewster, (Sir) D.* [1816] Edinb. R. S. T. 8 (1818) 353-.
- , cooled, colour figures, and conditions of formation. *Seebeck, T. J.* Schweigger J. 7 (1813) 259-, 382-; 12 (1814) 1-.
- , —, and gypsum, colours, etc. *Rollmann, W.* Halle Z. Nw. 3 (1854) 96-.
- , decomposed, rings of polarised light in specimens. *Brewster, (Sir) D.* B. A. Rp. (1840) (pt. 2) 6-.
- , heated, effects on polarised light. *Brewster, (Sir) D.* Phil. Trans. (1816) 46-.
- , —, —, —, (Brewster). *Schweigger, J. S. C.* Schweigger J. 18 (1816) 256-.
- , —, and unannealed drops, optical properties and structure. *Brewster, (Sir) D.* [1814] Phil. Trans. (1815) 1-.
- , plates, vibrating, property. *Biot, J. B.* Par. S. Phlm. Bll. (1819) 174-.
- , strained (lecture experiment). *Mack, K.* A. Ps. C. 69 (1899) 801-.
- , —, neutral axes as seen by polarised light, experiments. *Nickerson, L.* Franklin I. J. 65 (1873) 113-; Am. S. CE. T. 3 (1875) 31-.
- , unannealed, polarisation. *Brewster, (Sir) D.* [1814] Phil. Trans. (1814) 436-; (1815) 1-.
- Interference experiments with polarised light. *Arago, D. F. J., & Fresnel, —.* A. C. 10 (1819) 288-.
- , —, —, —, Fresnel-Arago, new form. *Mach, E., & Rosický, W.* [1875] Wien Ak. Bs. 72 (1876) (Ab. 2) 197-.
- , —, —, —, simple modification. *Kolářek, F.* Carl Rpm. 15 (1879) 672-.

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in convergent light, chromatic polarisation. *Willigen, V. S. M. van der.* Amst. Vs. Ak. 7 (1873) 71-; Harl. Arch. Ms. Teyl. 3 (1874) 241-, 388.

- Metallic plates, compressed, phenomena. *Casari*, L. A. Sc. Lomb. Ven. 8 (1838) 142-.
- Optical torque. *Thompson*, S. P. R. I. P. 12 (1889) 474-.
- Organic substances, cross in polarised light. *Lang*, V. von. A. Ps. C. 123 (1864) 140-.
- Polarised light, singular property. *Moigno*, F. C. R. 22 (1846) 161-.
- Pressure on gelatin, polarisation due to. *Brewster*, (Sir) D. Phil. Trans. (1815) 60-.
- , polarisation due to. *Biot*, J. B. A. C. 3 (1816) 386-; Par. S. Phlm. Bll. (1816) 49-.
- Strains, distribution, studied by polarised light. *Marston*, A. Ps. Rv. 1 (1894) 127-.
- , —, —, —, —. *Crandall*, C. L., & *Marston*, A. Am. S. CE. T. 32 (1894) 99-.

4040 Rotatory Polarisation and Dispersion, Structural and Magnetic. General.

(See also 6650, 6655; Chemistry 7315.)

ROTATORY DISPERSION.

- Grimbert*, L. J. Phm. 16 (1887) 295-, 345-.
- Guye*, P. A., & *Jordan*, C. Arch. Sc. Ps. Nt. 1 (1896) 476-, 581.
- Absorption and dispersion of light by media with rotatory power. *Cotton*, A. A. C. 8 (1896) 347-.
- of light by media with rotatory power. *Carvalho*, E. C. R. 122 (1896) 985-.
- , unequal, of right- and left-handed circular vibrations in rotating substances. *Cotton*, A. C. R. 120 (1895) 989-.
- Anomalous dispersion of absorbing substances. *Cotton*, A. C. R. 120 (1895) 1044-.
- , case. *Wyss*, G. H. von. A. Ps. C. 33 (1888) 554-.
- , — (Wyss). *Lippich*, F. A. Ps. C. 36 (1889) 767-.
- of crystals. *Moreau*, G. C. R. 120 (1895) 258-.
- Chromatic polarisation, theory. *Cauchy*, A. L. C. R. 18 (1844) 961-; 25 (1847) 331-.
- Colours developed in homogeneous liquids by polarised light. *Fresnel*, A. J. [1818] Par. Mm. Ac. Sc. 20 (1849) 163-.
- , —, —, —, — (memoir by Fresnel, supposed to be lost). *Biot*, J. B. C. R. 22 (1846) 405-.
- Compensation of dispersion due to unequal rotatory power. *Biot*, J. B. C. R. 35 (1852) 613-; A. C. 36 (1852) 405-.
- Elements of natural bodies and optical effects, new relation between. *Biot*, J. B. C. R. 2 (1836) 540-.
- Examples. *Guye*, P. A., & *Melikian*, P. A. C. R. 123 (1896) 1291-.
- Law. *Lommel*, E. C. J. A. Ps. C. 20 (1883) 578-.
- Quartz, dispersion of infra-red rays. *Desains*, P. C. R. 62 (1866) 1277-.
- Quartz, dispersion of infra-red rays. *Dongier*, R. C. R. 125 (1897) 228-.
- , — light on rotation of plane of polarisation. *Stefan*, J. [1864] Wien Sb. 50 (1865) (Ab. 2) 88-.
- plate cut at right angles to axis, deviations from plane of polarisation of resultant colours in. *Soleil*, H. C. R. 53 (1861) 640-.
- Sugar solutions, dispersion of colours on rotation of plane of polarisation. *Stefan*, J. [1865] Wien Sb. 52 (1866) (Ab. 2) 486-.

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- Babinet*, J. C. R. 4 (1837) 900-.
- (Babinet.) *Biot*, J. B. C. R. 4 (1837) 917-.
- Laurent*, P. A. C. R. 18 (1844) 936-.
- (Laurent.) *Cauchy*, A. L. C. R. 18 (1844) 940-.
- (—) *MacCullagh*, J. B. A. Rp. (1844) (pt. 2) 7.
- Briot*, C. C. R. 50 (1860) 141-.
- Gladstone*, J. H. [1860] C. S. J. 13 (1861) 254-.
- (Briot.) *Btazewski*, R. O. [1873] (xii) Krk. Ak. (Mt.-Prz.) Rz. & Sp. 1 (1874) xi-.
- Landolt*, H. H. Lieb. A. 189 (1877) 241-.
- Anomalous rotation. *Dutoit*, P., & *Habel*, W. Arch. Sc. Ps. Nt. 8 (1899) 100.
- Applications. *Tait*, P. G. Edinb. R. S. P. 10 (1880) 473-.
- to determination of organic substances. *Otto*, J. Arch. Mth. Ntvd. 12 (1888) 158-.
- Asymmetry, molecular. *Guye*, P. A. C. R. 110 (1890) 714-; 111 (1890) 745-; A. C. 25 (1892) 145-.
- , —, and rotatory power of organic compounds. (Guye's theory of optical activity.) *Piutti*, A. Nap. Rd. 33 (1894) 75-.
- Bi- and mono-refractive substances. *Quesneville*, G. Mon. Sc. 2 (1888) 1074-.
- Bi-refractive substances. *Quincke*, G. D. Nf. B. (*1883) 64.
- Bodies which rotate plane of polarisation. *Polli*, G. Polli A. 17 (1853) 125-.
- Case, new. *Wulff*, J. V. Rs. Ps.-C. S. J. 23 (Ps.) (1891) 436-; J. de Ps. 1 (1892) 405.
- Castor oil. *Popp*, O. (xii) Arch. Phm. 195 (1871) 233-.
- Colours of rotatory polarisation. *Haidinger*, W. Moigno Cosmos 6 (1855) 454-.
- Crystalline mixtures of isomorphous substances, optical properties, and explanation of rotatory polarisation. *Mallard*, E. A. Mines 19 (1881) 256-; C. R. 92 (1881) 1155-.
- reflection, internal, in crystal with rotatory power. *Brunhes*, B. Arch. Néerl. 5 (1900) 1-.
- Crystals, dextro- and laevo-rotating, separation. *Kreider*, D. A. Am. J. Sc. 8 (1899) 133-.
- , rotatory, in state of powder, behaviour. *Landolt*, H. Berl. B. 29 (1896) 2404-.
- , —, structure. *Wyrouboff*, G. J. de Ps. 5 (1886) 258-.
- , uni- and biaxial, hemihedral or hemimorphic forms, relation to phenomena of rotatory polarisation. *Desclotzeaux*, A. B. A. Rp. (1862) (pt. 2) 19-.

- Direction, indication. *Govi, G.* C. R. 91 (1880) 517-.
- of rotation of optically active substances, change. *Landolt, H. H.* Berl. B. 13 (1880) 2329-.
- Energy transmission, application to rotatory polarisation. *Broca, A.* C. R. 125 (1897) 765-.
- Experimental model. *Mauritius, —.* Exner Rpm. 20 (1884) 556-.
- Fresnel's works. *Baumgartner, A. von.* Baumgartner Z. 2 (1897) 1-.
- Gyrostatically loaded chain, vibrations, rotatory polarisation illustrated by. *Larmor, J.* [1890] L. Mth. S. P. 21 (1891) 423-.
- media, propagation of disturbances in, and rotatory polarisation of light. *Larmor, J.* [1891] L. Mth. S. P. 23 (1892) 127-.
- Infra-red rays. *Tyndall, J. J.* de Ps. 1 (1872) 101-.
- Isotropic media, polarisation in. *Niven, C.* QJ. Mth. 9 (1868) 235-.
- Liquids (various). *Arndtsen, A.* C. R. 47 (1858) 738-; A. C. 54 (1858) 403-.
- which rotate plane of polarisation. *Dove, H. W.* Berl. Mb. (1860) 292-.
- , rotatory polarisation, method of increasing. *Botzenhart, —.* Haidinger B. 2 (1846-47) 173-.
- , —, phenomena. *Pasteur, L.* J. Phm. 13 (1848) 449-.
- , — by transmission through. *Leeson, H. B.* [1843] C. S. Mm. 2 (1843-45) 26-.
- , — power, laws of variation. *Biot, J. B.* C. R. 31 (1850) 101-; A. C. 29 (1850) 430-.
- , similar action on polarised light, in motion and at rest. *Biot, J. B.* C. R. 17 (1843) 1209-.
- Magnetic and rotatory polarisation. *Moreau, G.* A. C. 1 (1894) 289-.
- rotatory polarisation, influence of temperature. *Hirsch, E.* A. Ps. C. 48 (1893) 446-.
- Mathematical analysis applied to physical phenomena. *Cauchy, A. L.* C. R. 15 (1842) 910-.
- Optically active substances, influence of inactive solvents. *Oudemans, A. C.* (jun.). Amst. Vs. Ak. 6 (1872) 334-; Arch. Néerl. 8 (1873) 63-.
- , —, —. *Baumgartner, G.* Carl Rpm. 12 (1876) 80-.
- , —, — and concentration. *Hoorweg, J. L.* [1872] (xii) Mbl. Nt. 3 (1873) 12-.
- Parallel light, rotatory polarisation in. *Quesneville, G.* Mon. Sc. 1 (1887) 695-, 1187-.
- Passage of light through plate of rotatory polarising material. *Voigt, W.* A. Ps. C. 22 (1884) 237-.
- Pressure, influence on various physical phenomena. *Röntgen, W. C.* A. Ps. C. 45 (1892) 98-.
- Sarasin, É., & Soret, J. L.* Arch. Sc. Ps. Nt. 54 (1875) 253-; C. R. 81 (1875) 610-; 83 (1876) 818-; 84 (1877) 1362-; 95 (1882) 635-; Arch. Sc. Ps. Nt. 8 (1882) 5-, 97-, 201-.
- Lang, V. von.* [1876] Wien Ak. Sb. 74 (1877) (Ab. 2) 209-.
- Carvalho, E.* A. C. 26 (1892) 113-.
- König, W.* Frkf. a. M. Ps. Vr. Jbr. (1893-94) 26-.
- graphic table of coloration produced by, in polarised light. *D'Henry, L.* Par. S. Ps. Sé. (1884) 69-.
- optical properties and crystalline form, connection. *Dove, H. W.* Pogg. A. 40 (1837) 607-.
- quadruple refraction near axis. *Quesneville, G.* Mon. Sc. 7 (1893) 521-.
- rotation of infra-red rays. *Desains, P.* C. R. 84 (1877) 1056-.
- , —, —. *Hussell, A.* A. Ps. C. 43 (1891) 498-.
- , —, —. *Carvalho, E.* C. R. 114 (1892) 288-.
- , —, —. *Moreau, G.* A. C. 30 (1893) 433-.
- , —, —. *Dongier, R.* C. R. 126 (1898) 1627-; A. C. 14 (1898) 331-.
- rotatory power and structure. *Soleil, —.* C. R. 20 (1845) 435-.
- in ultra-violet. *Croullebois, M.* C. R. 81 (1875) 666-.
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- Dufour, H. Laus. S. Vd. Bl.* 17 (1881) 476-.
- (Bell's spectrophone.) *Dufourcet, E. (xii) Dax S. Borda Bl.* 6 (1881) 205-.
- (Preece's investigations.) *Géraldy, F. Lum. Élect.* 3 (*1881) 297-.
- (Use of selenium.) *Jamieson, A. [1881] Glasg. Ph. S. P.* 13 (1882) 109-.
- (Without battery.) *Kalischer, S. Carl Rpm.* 17 (1881) 563-.
- (Photophony and radiophony.) *Lucchi, G. de. Ven. Aten.* (1) (1881) 410-.
- (Use of selenium.) *Mercadier, E. C. R.* 92 (1881) 705-.
- (Influence of temperature on selenium receivers.) *Mercadier, E. C. R.* 92 (1881) 1407-.
- (Lamp-black instead of selenium.) *Mercadier, E. C. R.* 93 (1881) 457-.
- Mercadier, E. Lum. Élect.* 3 (*1881) 8-, 37-, 51-, 276-, 291-, 356-, 408-; 4 (*1881) 276-, 347-; 5 (*1881) 105-, 119-.
- (Indirect radiophony.) *Mercadier, E. Lum. Élect.* 4 (*1881) 295-.
- (Electric multiple autoreversible telerradiophone.) *Mercadier, E. C. R.* 93 (1881) 541-; *Lum. Élect.* 5 (*1881) 19-.
- Munro, J. J. Sc.* 3 (1881) 208-.
- Preece, W. H. Tel. E. J.* 10 (1881) 212-.
- (Expansion of diaphragm.) *Rayleigh, (Lord). Nt.* 23 (1881) 274-.
- (Sounds due to intermittent radiation in gases.) *Röntgen, W. C. Giessen Oberh. Gs. B.* 20 (1881) 19-.
- (Construction.) *Thompson, S. P. L. Ps. S. P.* 4 (1881) 184-; *Ph. Mg.* 11 (1881) 286-.
- (Action of intermittent beam of radiant heat on gases.) *Tyndall, J. R. S. P.* 31 (1881) 307-, 478-.
- Preece, W. H. R. S. P.* 31 (1881) 506-.

- (Radiant heat, conversion by free molecules into sound.) *Tyndall, J.* [1881] *Phil. Trans.* 173 (1883) 291-.
- Bartoniak, G.* *Termt. Közl.* 16 (1884) 331-.
- (Two new radiophones.) *Mercadier, E. C. R.* 101 (1885) 944-.
- Heritsch, A. A. Ps. C.* 29 (1886) 665-.
- (Electrochemical radiophony.) *Chaperon, G., & Mercadier, E. C. R.* 106 (1888) 1595-; *A. Tél.* 15 (1888) 425-.
- Mercadier, —, & Chaperon, —.* *Par. S. Ps. Sé.* (1890) 166-.
- (Production of sound in microphone by intermittent radiation.) *Semmola, E. Nap. I. Inc. At.* 6 (1893) No. 5, 5 pp.; *C. R.* 118 (1894) 525.
- (Sound transmission by ultra-violet rays (selenium).) *Dussaud, —.* *C. R.* 128 (1899) 171.
- Phototropy, temporary changes due to light. *Marckwald, J. Ps. Z.* 1 (1900) 147-.
- Platinum strip radiator (meldometer). *Gray, P. L.* [1894] *Birm. Ph. S. P.* 9 (1895) 73-.
- Radiant energy. *Golicyn, (Prince) B. Mosc. Un. Mm. (Ps.-Mth.)* 10 (1893) 34 pp.; *A. Ps. C.* 47 (1892) 479-; 48 (1893) 748.
- (*Golicyn, Sokolov, A. P., & Stol'tov, A. G. Mosc. Un. Mm. (Ps.-Mth.)* 11 (1894) 69 pp.; *Fschr. Ps.* (1893) (*Ab. 2*) 405-.
- (—). *Schiller, N. N. Fschr. Ps.* (1894) (*Ab. 2*) 439-.
- *Götz, H.* [1895] *Augsb. Nt. Vr. B.* (1896) 273-.
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- Tyndall, J.* [1865-83] *Smiths. Rp.* (1868) 292-; *R. I. P.* 10 (1884) 253-.
- Tait, P. G. Edinb. R. S. P.* 12 (1884) 531-.
- Garbe, P. Toul. Fac. Sc. A.* 1 (1887) F, 91 pp.
- Smoluchowski, M. Kosmos (Lw.)* 25 (1900) 74-.
- of bodies as affected by nature of surrounding medium. *Quintus-Idilius, G. von. D. Nf. B.* 40 (1865) 111; *A. Ps. C.* 127 (1866) 30-.
- electromagnetic, measurement. *Boys, C. V., Briscoe, A. E., & Watson, W. L. Ps. S. P.* 11 (1892) 20-; *Ph. Mg.* 31 (1891) 44-.

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(For Reflection, Refraction and Absorption of Heat Rays see 3855.)

- Poisson, S. D. A. C.* 26 (1824) 225-, 442-.
- Moreau de Jonnés, A. Quetelet Cor. Mth.* 1 (1825) 150-.
- Powell, B. B. A. Rp.* (1831-32) 259-.
- Talbot, W. H. F. Ph. Mg.* 8 (1836) 189-.
- Melloni, M. Bb. It.* 86 (1837) 190-; 89 (1838) 107-.

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- Powell, B. B. A. Rp.* (1840) 1-; (1854) 337-.
- Stewart, B. B. A. Rp.* (1859) (*pt. 2*) 23.
- Tyndall, J. Ph. Mg.* 23 (1862) 252-; *R. I. P.* 4 (1863) 146-.

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— *Fischer, K. T. Nt.* 62 (1900) 103-.

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— (—) (Melloni). *Luca, F. de. Nap. Rd.* 1 (1842) 28-.

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— surfaces. *Magnus, G. Berl. Mb.* (1869) 713-; *A. Ps. C.* 140 (1870) 337-.

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— (—) (Gay-Lussac). *Prevost, P. A. C.* 31 (1826) 429-.

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- relationships. *Martens, M.* Liège A. Ac. (1819-20) 34 pp.
- solar, separation. *Herschel, (Sir) W.* Phil. Trans. (1800) 255-.
- , — (*Herschel*). *Leslie, J.* Nicholson J. 4 (1801) 344-, 416-.
- , — (*Herschel's* researches, *Leslie's* criticisms). *Benzenberg, J. F.* Gilbert A. 10 (1802) 356-.
- , —, *Wünsch, (Prof.)* —. Berl. Gs. Nt. Fr. Mg. 1 (1807) 185-.
- , — (*Wünsch*). *Ritter, J. W.* Gehlen J. 6 (1808) 633-.
- , — (*Herschel*). *Goethe, J. W. von* [with remarks by *Ritter, J. W.*]. Gehlen J. 6 (1808) 719-.
- , — (*Wünsch*). *Heinrich, P.* Gehlen J. 6 (1808) 729-.
- , — (*Herschel*). *Reade, J.* Tilloch Ph. Mg. 45 (1815) 422-.
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- , — in theory and practice. *Brande, W. T.* (vi Add.). Rm. Cor. Sc. 2 (1853) 14.
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- , —, —. *Le Conte, J.* Science 1 (*1883) 543.
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- , *Biot, J. B.* C. R. 8 (1839) 259-; 9 (1839) 719-.
- Scintillation of gas flames. *Forel, F. A. C.* R. 89 (1879) 408-.
- Spectroscope, use to distinguish feeble light in stronger one. *Seguin, J. M.* C. R. 68 (1869) 1322-.
- Spectrum analysis, quantitative. *Janssen, J. C. R.* 71 (1870) 626-.
- , —, *Vierordt, K. [von].* D. C. Gs. B. 4 (1871) 327-, 457, 519; 5 (1872) 34-.
- , — (*Janssen*). *Champion, P., Pellet, H., & Grenier, M.* C. R. 76 (1873) 707-.
- , — (*Champion, Pellet & Grenier*). *Janssen, J. C. R.* 76 (1873) 711-.
- , —, *Vierordt, K. von.* A. Ps. C. 3 (1878) 357-.
- , —, estimation of indigo by. *Vierordt, K. von.* Fresenius Z. 17 (1878) 310-.
- , —, and titration. *Vierordt, K. von.* Lieb. A. 177 (1875) 31-.
- Temperature of sun, measuring. *Gray, P. L.* Birm. Ph. S. P. 9 (1895) 103-.
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- Thermoscopes, colour. *Rebenstorff, H. A.* Dresden Isis Sb. (1896) 31-.
- , electric. *Holtz, —.* N.-Vorp. Mt. 23 (1892) xi-.
- Vibratory energy. *Guillaume, C. É.* [1893] Arch. Sc. Ps. Nt. 31 (1894) 121-.

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- Reitlinger, E.* [1861] (VIII) Wien Schr. 2 (1863) 45-.
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- Artificial sources. *Abt. A.* [1878] (xii) Kolozsvár Orv.-Term. Társ. Éts. [3] (1879) (*Term. Estél.*) 31-.
- Flames charged with powdered salts. *Gouy, A. C. R.* 85 (1877) 439-.
- , coloured, projection of bright lines. *Debray, H. A. C.* 65 (1862) 331-.
- , —, for use in spectrum analysis. *Dufour, H. Laus. S. Vd. Bil.* 29 (1893) 309-.
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- , oxyhydrogen, production of spectra by. *Marvin, T. H.* [1875] *Ph. Mg.* 1 (1876) 67-.
- , source of light in. *Frankland, E.* [1868] *R. I. P.* 5 (1869) 419-.
- Gas-flame, electric and solar spectra, effects on eye. *Pickering, W. H.* *Nt.* 25 (1882) 340-.
- Gas-jet giving white light from incandescent magnesia. *Clamond, C. C. R.* 98 (1884) 366-.
- Homogeneous light of great intensity. *Talbot, W. H. F.* *Ph. Mg.* 3 (1833) 35.
- , spectral apparatus for illumination with. *Leiss, C. Z. Instk.* 18 (1898) 209-.

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- Witz, A. C. R.* 121 (1895) 306-.
- Denayrouze, L. Rv. Sc.* 11 (1899) 769-.
- Efficiency of lamps. *Merritt, E.* [1888] *Am. J. Sc.* 37 (1889) 167-.
- Gas light. *Bunte, —.* [1896] *Karlsruhe Nt. Vr. Vh.* 13 (1900) (*Sb.*) 59-.
- , —. *Meyer, R. Braunsch. Vr. Nt. Jbr.* (11) (1899) 26-.
- , —. *Auer's. Karsten, G.* [1893] *Schl.-Holst. Nt. Vr. Schr.* 10 (1895) 70-.
- , —, theory. *Hohmann, C. S. C. In. J.* 16 (1897) 789.
- , —. *Bunte, H. Z. Angew. C.* (1898) 844-.
- , —. *Znatowicz's. Znatowicz, B. Kosmos (Lw.)* 20 (1895) 439-., 440.
- Mantles. *Demmler, —.* [1896] *Lüneb. Nt. Vr. Jh.* 14 (1898) xi-.
- , —. *Binder, A. Z. Nw.* 71 (1898) 435-.
- , —, radiation. *Le Chatelier, H., & Boudouard, O. C. R.* 126 (1898) 1861-.
- Relation between electric energy and radiation. *Abney, (Capt.) —, & Festing, (Lt.-Col.) —.* *R. S. P.* 37 (1884) 157-.
- Zirconia for oxyhydrogen light. *Caron, H. A. C. R.* 14 (1868) 311-; *C. R.* 66 (1868) 1040-.
- , —, —. *Draper, J. C. Am. J. Sc.* 14 (1877) 208-.
- , —, —. *Wright, L. Nt.* 35 (1887) 583.
- , —, —. *Kochs, W. Bonn Niedr. Gs. Sb.* (1890) 105-.
- ancient and modern. *Aldini, G. Mod. Mm. S. It.* 19 (1823) 223-.
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- , —, Siemens's. *Anon. Nt.* 40 (1889) 82-.
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- mercury arc. *Arons, L. A. Ps. C. (Berl. Ps. Gs. Vh.)* 1892) 47 (1892) 767-.
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- oil-, solar, theory of construction. *Lissenko, —.* *Dingler* 287 (1893) 280-.
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- , —, portable and safe apparatus for producing. *Guéhard, A., & Ranque, P. C. R.* 108 (1889) 514-.
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- , —, convenient production. *Fleischl von Marxow, E. A. Ps. C.* 38 (1889) 675-.
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- , —, production. *Kirschmann, A. Ph. Stud.* 6 (1891) 543-.
- , —, sources. *Fabry, C., & Perot, A. C. R.* 128 (1899) 1156-; *J. de Ps.* 9 (1900) 369-.

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—, —, photographic study. *Baldwin*, C. W. Ps. Rv. 3 (1896) 370-, 448-.

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- , *Eder, J. M., & Valenta, E.* [1895-96] Wien Az. 32 (1895) 218-; Mh. C. (1895) 893-; Wien Ak. Sb. 104 (1895) (Ab. 2a) 1171-; Mh. C. (1896) 50-; Wien Ak. D. 64 (1897) 1-.
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- , *Friedländer, S.* Z. Ps. C. 19 (1896) 657-.
- , *Kayser, H.* Berl. Ak. Sb. (1896) 551-.
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- , blue spectrum. *Kayser, H.* C. N. 72 (1895) 99-.
- , compound with carbon. *Crookes, W. C.* N. 72 (1895) 99.
- , and helium in electric discharge. *Collie, J. N., & Ramsay, W.* R. S. P. 59 (1896) 257-.
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- , spectroscopic research. *Rizzo, G. B.* Tor. Ac. Sc. At. 32 (1896) 570- or 830-.
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- , —, and gas spectra. *Gladstone, J. H.* [1861] R. S. P. 11 (1860-62) 305-.
- , spark method. *Brasack, F.* [1866] (ix) Halle Nf. Gs. Ab. 10 (1868) 1-.
- Alkali metals. *Wolf, C., & Diacon, E.* [1862] C. R. 55 (1862) 334-; Mntp. Ac. Sc. Mm. 5 (1861-63) 333-.
- in fused salts. *Gramont, A. de.* C. R. 122 (1896) 1411-; Par. S. C. Bll. 17 (1897) 778-.
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- Aurora. *Lockyer, J. N.* R. S. P. 43 (1888) 320-.
- , lines. *Huggins, W.* R. S. P. 45 (1889) 430-.
- Barium. *Freeman, J. H.* C. N. 18 (1868) 1-.
- Beryllium. *Hartley, W. N.* C. S. J. 43 (1883) 316-.
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- , spark-spectrum. *Gramont, A. de.* Fr. S. Mn. Bll. 21 (1898) 109.
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- , line spectrum. *Hartley, W. N.* R. S. P. 35 (1883) 301-.
- , —, ultra-violet. *Eder, J. M., & Valenta, E.* Wien Ak. D. 60 (1893) 307-.
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- , — (Lockyer). *Sainte-Claire Deville, C. J.* C. R. 82 (1876) 709-.
- , — (—). *Lecoq de Boisbaudran, P. É.* C. R. 82 (1876) 1264-.
- , spark-spectrum. *Gramont, A. de.* Fr. S. Mn. Bll. 18 (1895) 223-; 21 (1898) 105-.

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- Attfield, J.* Phil. Trans. (1862) 221-.
- Watts, W. M.* Ph. Mg. 38 (1869) 249-; 40 (1870) 100-; 41 (1871) 12-.
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- Watts, W. M.* Ph. Mg. 48 (1874) 369-, 456-.
- Attfield, J.* Ph. Mg. 49 (1875) 106-.
- Lockyer, J. N.* R. S. P. 30 (1880) 335-, 461-.
- (Lockyer.) *Dewar, J., & Living, G. D.* R. S. P. 30 (1880) 490-.
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- , *Herschel, A. S.* Nt. 60 (1899) 29.
- , calcium chloride. *Tomlinson, C.* Sturgeon A. Electr. 1 (1836-37) 212-.
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- , sugar. *Mons, J. B. van.* Brux. Ac. Bil. 6 (1839) 164-.
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- Pizzighelli, G.* Wien Pht. Cor. 13 (1881) 178-; 19 (1882) 4-, 36-, 49-, 69-, 81-, 134-, 166-, 181-, 194-, 210-, 226-, 239-, 255-, 269-; 20 (1883) 55-, 73-, 92-, 131-, 159-, 173-, 190-, 238-, 253-, 269-, 299-.
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- Chvolson, O.* St. Pet. Ac. Sc. Mm. (Rs.) 69 (1892) (App. No. 4) 245 pp.; Wild Rpm. Met. 15 (1892) No. 1, viii+166 pp.
- Saveljev, R. N.* Rs. Ps.-C. S. J. 25 (Ps.) (1893) 1-; A. C. 28 (1893) 394-; 29 (1893) 260-.
- (Saveljev.) *Wild, H.* A. C. 29 (1893) 283-.
- (—) *Chvolson, O. D.* Rs. Ps.-C. S. J. 25 (Ps.) (1893) 172-; A. C. 30 (1893) 141-.
- Lemoine, G.* C. R. 120 (1895) 441-.
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- , chemical. *Poey, A.* Fr. S. Mét. An. 11 (*1863) Pt. 2, 90-.
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- , electrochemical. *Gouy, —, & Rigollot, H.* C. R. 106 (1888) 1470-.
- , —, *Rigollot, H.* Lyon Un. A. [29] (1897) 138 pp.
- , Hurter and Driffield. *Eder, J. M.* Wien Pht. Cor. 29 (1892) 396-.
- Actinometry, electro-chemical. *Maréchal, C.* Éclair. Élect. 6 (1896) 445-, 540-, 588-.
- Bunsen-Roscoe law of intermittent lighting of gelatino-bromide. *Englisch, E.* D. Nf. Vh. (1898) (Th. 2, Hälfte 1) 171-.
- Energy, photographic, and atmospheric absorption, of most refrangible light rays. *Schumann, V.* Wien Pht. Cor. 26 (1889) 218-, 280-.
- Forces, chemical, of sunlight, measurement. *Marchand, E.* A. C. 30 (1873) 302-; C. R. 76 (1873) 762-.
- , —, —, — (Marchand). *Becquerel, E.* A. C. 30 (1873) 572-.
- Heliograph. *Jordan, T. B.* Cornwall Pol. S. T. (1859) 115-.
- Intensity, chemical, of sunlight, effect of prism. *Hessler, F.* Baumgartner Z. 3 (1835) 336-.
- , —, —, —, measurement. *Roscoe, H. E.* [1860] R. I. P. 3 (1858-62) 210-.
- , —, —, —, *Phipson, T. L.* C. N. 8 (1863) 135-; C. R. 57 (1863) 601-.
- , —, —, —, *Roscoe, H. E.* R. I. P. 4 (1863) 128-.
- , —, —, —, *Dewar, J.* Edinb. R. S. P. 7 (1872) 751-.
- , —, —, —, *Thorpe, T. E.* [1874] Glasg. Ph. S. P. 9 (1875) 108-.
- , —, —, —, *Andresen, M.* Wien Pht. Cor. 35 (1898) 502-.
- , of light at different angles. *Claudet, A.* B. A. Rp. (1851) (pt. 2) 45-.
- , —, —, measurement for photographic experiments. *Heeren, F.* Pogg. A. 64 (1845) 309-.
- , —, —, —, purposes. *Lipowitz, A.* Pogg. A. 61 (1844) 140-; 63 (1844) 348-.
- Movable plates. *Haton de la Goupillière, —.* C. R. 100 (1885) 953-.
- Photo-chemical researches. (Chemical action of light, laws.) *Roscoe, H. E., & Bunsen, R. W.* B. A. Rp. (1855) (pt. 2) 48-.
- , —, *Roscoe, H. E., & Bunsen, R. W.* Pogg. A. 96 (1855) 373-; B. A. Rp. (1856) 62-.
- , —, (Chemical action of light, measurement.) *Roscoe, H. E., & Bunsen, R. W.* [1856] Phil. Trans. (1857) 355-.
- , —, (Photo-chemical induction.) *Roscoe, H. E., & Bunsen, R. W.* Phil. Trans. (1857) 381-.

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Image on retina of insect's eye, photography.
Eder, J. M. Wien Pht. Cor. 27 (1890) 410-.
 Infinitely great and infinitely small, study of.
Olivier, L. Rv. Sc. 3 (1882) 353-, 426-.

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Brühl, P. A. Ps. C. 26 (1885) 334-.
Cazes, —. Par. S. Ps. Sé. (1885) 130.
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Volkmer, O. Wien Pht. Cor. 23 (1886) 397-.
Jesse, O. Met. Z. 5 (1888) 483-.
N., A. F. Science 12 (1888) 11-.
Prinz, W. Ciel et Terre 9 (1888-89) 337-, 525-.
Woods, C. R. [1888] S. Afr. Ph. S. T. 5 (1893) 298-, 303.
Adams, A. J. S. Elect. 23 (1889) 304-.
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Blümel, A. Berl. Ps. Gs. Vh. (1896) 117-.
Glew, F. H. Nt. 58 (1898) 627.
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 and black sparks. *Clayden, A. W.* L. Ps. S. P. 10 (1890) 180-; Ph. Mg. 28 (1889) 92-.
 by daylight. *Henry, A. J.* U. S. Mly. Weath. Rv. 23 (1895) 379.
 —, application of wireless electric waves.
Glew, F. H. Phot. J. 23 (1899) 179-.
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Mines, photography in. *Hughes, H. W.* Fed. I. Mn. E. T. 7 (1894) 164-, 353-; 8 (1895) 126.
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 Opaque bodies, photography. *Laforge, L.* Angers Ac. Sc. Mm. 3 (1894-95) 105-.
 —, — through, with petroleum lamp. *Armatignac, —.* Bordeaux S. Md. Mm. (1896) 65-.
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Seidel, L. Münch. Sb. 2 (1861) 290-.
 Palimpsests, photographic reconstruction.
Pringsheim, E., & Gradenwitz, —. Berl. Ps. Gs. Vh. (1894) 58-.
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 — — — and railways. *Candèze, E.* Brux. Ac. Bil. 3 (1882) 468-.
 — and coordinate surveying. *Stanley, H. M.* [1891] Am. I. Mn. E. T. 20 (1892) 740-.
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 Rolling-curves, method of obtaining. *Huet, —.* C. R. 80 (1875) 380-.
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 —, —. *Meldola, R.* Essex Ntlist. 8 (1894) 39-.

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 —, —. *Boltzmann, L.* Wien Az. 19 (1882) 242-.
 —, —. *Lloyd, R. J.* Lpool. Lt. Ph. S. P. 45 (1891) 139-.
 —, —. *Sharpe, B. F.* U. S. Mly. Weath. Rv. 27 (1899) 205-.
 —, — (by "Schlieren-Methode"). *Wood, R. W.* Ph. Mg. 48 (1899) 218-.
 —, —. *Wood, R. W.* R. S. P. 66 (1900) 283-; Phot. J. 24 (1900) 250-; Nt. 62 (1900) 342-.

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Wheeler, T. R. Pht. S. J. 6 (1860) 256-.
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 Arc spectra. *Vogel, H. W.* Berl. Ps. Gs. Vh. (1889) 20.
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 Hydrogen, second spectrum in ultra-violet.
Schumann, V. Wien Pht. Cor. 23 (1886) 305-.
 Infra-red spectrum, simple method of photographing. *Ångström, K.* Ups. S. Sc. N. Acta 17 (1898) No. 2, 4 pp.
 Light of very small wave-length. *Schumann, V.* Science 20 (1892) 216-; Wien Az. 29 (1892) 230-; Wien Ak. Sb. 102 (1893) (Ab. 2a) 415-, 625-; C. N. 71 (1895) 228; Wien Az. 32 (1895) 28-, 121-; 37 (1900) 71-.
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Hartley, W. N. Phil. Trans. 175 (1885) 49-, 325-.
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 —. *Boutan, L.* C. R. 117 (1893) 286-; Nt. 58 (1898) 18.
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(See also *Chemistry* 7350, 7400.)

- Becquerel, E.* C. R. 26 (1848) 181-; A. C. 22 (1848) 451-; 25 (1849) 447-.
- Niépce de Saint-Victor, A.* C. R. 32 (1851) 834-; 34 (1852) 215-; 35 (1852) 694-.
- Becquerel, E.* C. R. 39 (1854) 63-; A. C. 42 (1854) 81-.
- Henderson, P.* [1855] Pht. S. J. 2 (1856) 122-.
- Mercer, J. B. A. Rp.* (1858) (pt. 2) 57.
- Niépce de Saint-Victor, A.* C. R. 54 (1862) 281-; 56 (1863) 90-; 63 (1866) 567-.
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- Saint-Florent, — de.* Brux. Bl. Pht. 13 (1874) 40-, 59-, 90-.
- Ducos du Hauron, —.* Brux. Bl. Pht. 13 (1874) 113-, 132-, 156-; 14 (1875) 60-, 123-, 158-, 213-; 15 (1876) 11-, 27-, 48-.
- Cros, C.* C. R. 82 (1876) 1515; 83 (1876) 291-.
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- Jaffé, M.* Wien Pht. Cor. 15 (1878) 139-.
- Schnauss, J. C.* Lplidina. 14 (1878) 120-.
- Carpentier, J., & Cros, C.* C. R. 92 (1881) 1504-.
- Scolik, C.* Wien Pht. Cor. 21 (1884) 121-, 191-, 234-, 247-.
- Vogel, H. W.* A. Ps. C. 28 (1886) 130-.
- Ives, F. E.* Franklin I. J. 127 (1889) 54-.
- Eder, J. M.* Wien Pht. Cor. 27 (1890) 260-.
- Härtwig, —.* Magdeb. Nt. Vr. Jbr. u. Ab. (1890) 36-.
- Schnauss, J.* Lplidina. 26 (1890) 203-.
- Vogel, H. W.* Berl. Ps. Gs. Vh. (1890) 73-.
- Hatzfeld, A.* Rv. Sc. 47 (1891) 609-.
- Ives, F. E.* Franklin I. J. 131 (1891) 1-.
- Vogel, H. W.* Wien Pht. Cor. 28 (1891) 551-.
- Meslin, G.* A. C. 27 (1892) 369-.
- Valenta, E.* Wien Pht. Cor. 29 (1892) 432-; 30 (1893) 577-.
- Pfaundler, L.* Steierm. Mt. (1894) xlv-.
- Wall, E. J.* Cornwall Pol. S. Rp. (1894) 93-.
- Warneke, L.* [1894] Phot. J. 19 (1895) 80-.
- Neuhauß, R.* Berl. Ps. Gs. Vh. (1895) 17-.
- Wiener, O.* A. Ps. C. 55 (1895) 225-.
- Glan, P.* A. Ps. C. 58 (1896) 402-.
- Joly, J.* [1896] Dubl. S. Sc. T. 6 (1898) 127-.
- Kirbuss, O.* Königsb. Schr. 37 (1896) [3]-.
- König, W.* Frkf. a. M. Ps. Vr. Jbr. (1895-96) 33-.
- Wall, E. J.* S. C. In. J. 15 (1896) 400-.
- Freuchen, P.* N. Ts. Fs. K. 2 (1897) 337-.
- Niewenglowski, G. H.* Smiths. Rp. (1898) 209-.
- Shepherd, E. S.* Phot. J. 23 (1899) 316-.
- Drecker, J.* [1900] Ps. Z. 2 (1901) 44-.
- Eder, —.* Z. Angew. C. (1900) 1273-.
- König, —.* [1900] N.-Vorp. Mt. 32 (1901) xiv-.
- Kohl, F. G.* Wien Pht. Cor. 37 (1900) 602-, 650.
- Lucas, (le rév. père) —.* Brux. S. Sc. A. 24 (1900) (Pt. 1) 108-.
- actino-polychrome pictures, probability of producing. *Ross, W.* [1854] Pht. S. J. 2 (1856) 69-.

- application of colour vision theory. *Abney, (Capt.) W. de W.* [1898] R. I. P. 15 (1899) 802-.
- diffraction-grating. *Wood, R. W.* Ph. Mg. 47 (1899) 368-; Science 9 (1899) 859-; Phot. J. 24 (1900) 256-.
- grating films. *Thorpe, T.* Manch. Lt. Ph. S. Mm. & P. 44 (1900) No. 12, 8 pp.
- colour printing and relief processes. *Vidal, L.* A. Cons. Arts et Mét. 4 (1892) 192-.
- composite. *Ives, F. E.* S. C. In. J. 14 (1895) 987-.
- direct. *Delvallez, L.* C. R. 127 (1898) 207-.
- fixation of spectral colours. *Geymet, (T.?).* Brux. Bl. Pht. 13 (1874) 164-.
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- Joly's method. *Du Bois-Reymond, C.* Berl. Ps. Gs. Vh. (1895) 73-.
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- *Gibson, J. S.* [1898] Sc. Abs. 2 (1899) 11-.
- *Eder, J. M.* Wien Pht. Cor. 36 (1899) 26-.
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- Lippmann, G.* [1891] C. R. 112 (1891) 274-; A. Cons. Arts et Mét. 4 (1892) 161-.
- Becquerel, E.* C. R. 112 (1891) 275-.
- Berget, A.* Rv. Sc. 48 (1891) 33-.
- Ives, F. E.* Franklin I. J. 132 (1891) 141-.
- Labatut, —.* [1891] C. R. 113 (1891) 126-; Isère S. Bl. 27 (1892) 357-.
- Mancini, E.* N. Antol. Sc. 115 (1891) 759-.
- Marangoni, C.* Rv. Sc.-Ind. 23 (1891) 195-.
- Thwing, C. B.* Am. J. Sc. 42 (1891) 388-.
- Vogel, H. W.* Berl. Ps. Gs. Vh. (1891) 33-.
- Korda, D.* Termt. Közl. 24 (1892) 190-.
- Krone, H.* A. Ps. C. 46 (1892) 426-.
- Lippmann, G.* C. R. 114 (1892) 961-; Rv. Sc. 50 (1892) 33-; C. R. 115 (1892) 575.
- Krone, H.* Wien Pht. Cor. 30 (1893) 226-.
- Mareschal, G.* Gén. Civ. 23 (1893) 125-.
- Sire, —.* [1893] Doubs S. Mm. 8 (1894) xii-.
- Lumière, A., & Lumière, L.* [1894] Lyon S. Ag. A. 2 (1895) xl-; Lyon Ac. Mm. 3 (1895) 137-.
- Léger, A.* [1894] Lyon Ac. Mm. 3 (1895) 211-.
- Valenta, E.* D. Nf. Vh. (1894) (Th. 2, Hälfte 1) 78-.
- Bonacini, C.* Spet. It. Mm. 23 (1895) 146 (bis)-.
- Lumière, A., & Lumière, L.* [1895] C. R. 120 (1895) 875-; Lyon S. Ag. A. 3 (1896) xlv-.
- Lippmann, G.* [1896] R. I. P. 15 (1899) 151-; R. S. P. 60 (1897) 10-.
- Schütt, F.* A. Ps. C. 57 (1896) 533-.
- Giesel, F.* Braunsch. Vr. Nt. Jbr. (10) (1897) 9-.
- Lippmann, G.* [1897] Phot. J. 22 (1898) 121-.
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- Lüppo-Cramer*, —. *Wien Pht. Cor.* 37 (1900) 552-.
- Buss*, O. *Wien Pht. Cor.* 37 (1900) 677-, 761. and *Becquerel's. Meldola, R.* Nt. 54 (1896) 28.
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- and *Lumière's.* *Warneke, L.* [1893] *Phot.* J. 18 (1894) 52-.
- —. *Ives, F. E.* *Franklin I. J.* 137 (1894) 16-.
- — and *Valenta's.* *Ives, F. E.* [1893] *Phot.* J. 18 (1894) 124-.
- theory. *Lippmann, G.* C. R. 118 (1894) 92-.
- Zenker's* films in. *Neuhaus, R.* A. Ps. C. 65 (1898) 164-; *Berl. Ps. Gs. Vh.* (1898) 94-.
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- and measurement. *Cros, C.* *Par. S. Ps. Sé.* (1879) 35-.
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- polychromy. *Vidal, L.* C. R. 77 (1873) 340-; (xi) *Brux. Bll. Pht.* 12 (1873) 173-; 13 (1874) 24-; 14 (1875) 38-.
- printing. *Gatty, J. A.* [1866] *Manch. Lt. Ph. S. P.* 6 (1867) 7-.
- —. *Husnik, J.* *Wien Pht. Cor.* 15 (1878) 1-.
- and printing positives without silver salts, method. *Testud de Beaugard, —.* *Pht. S. J.* 2 (1856) 195-.
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- — coloured spectra by light. *Abney, (Capt.) W. de W.* R. S. P. 29 (1879) 190.
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- Selle's* method. *Neuhaus, —.* [1896] *Phot. J.* 21 (1897) 93-.
- —, and tricolour prints. *König, W.* [1898] *Frkf. a. M. Ps. Vr. Jbr.* (1898-99) 30-.
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- of solar spectrum. *Becquerel, E.* C. R. 26 (1848) 181-; A. C. 22 (1848) 451-; 25 (1849) 447-.
- spectrum impressed on silver chloride, and its bearing on silver printing in photography. *Abney, (Capt.) W. de W.* C. N. 44 (1881) 184-.
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- — (—). *Abney, (Capt.) W. de W.* Nt. 55 (1896-97) 318-.
- — (—). *Wood, (Sir) H. T.* Nt. 56 (1897) 223.
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- —, use of coloured glasses. *Delaurier, —.* *Par. S. C. Bll.* 1 (1889) 706-.
- use of organic colours. *Richard, G. A.* C. R. 122 (1896) 609-, 687.
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- — illumination. *Abney, (Capt.) W. de W.* *Phot. J.* 8 (1884) 88-, 110.
- —. *Debenham, W. E.* *Phot. J.* 8 (1884) 117-.
- —. *Woods, C. R.* *Phot. J.* 8 (1884) 138-.
- —. *Abney, (Capt.) W. de W.* *Phot. J.* 15 (1891) 164-.
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- —. *Eder, J. M.* *Wien Pht. Cor.* 20 (1883) 87-, 162-, 189-; 21 (1884) 11-, 44-, 173-; 22 (1885) 111-, 181-, 372-, 455-.
- —, colour sensitiveness. *Eder, J. M.* *Wien Pht. Cor.* 21 (1884) 95-, 120-, 224-.
- —, mixtures of different. *Schumann, V.* *Wien Pht. Cor.* 22 (1885) 232-.
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- , improvements. *Singer, S.* Brux. Bl. Pht. 15 (1876) 116-, 127-, 144-.
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- , green, preparation. *Eder, J. M., & Tóth, V.* Wien Pht. Cor. 16 (1879) 209-.
- , photography with. *Eder, J. M.* Wien Pht. Cor. 17 (1880) 109-, 141-, 151-.
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- , photography with. *Eder, J. M., & Pizzighelli, G.* Wien Pht. Cor. 18 (1881) 79-, 103-, 122-, 153-, 215-.
- , halogen, photochemical induction in. *Aebegg, R.* [1900] Ps. Z. 2 (1901) 24.
- , phosphate, action of silver chromate. *Valenta, E.* Wien Pht. Cor. 37 (1900) 449-.

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(See also 6840; Chemistry 7305.)

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- , *Girard, C., & Bordas, F.* C. R. 122 (1896) 604-.
- , *Golicyn, (Prince) B. B., & Karnożickij, A. N.* C. R. 122 (1896) 717-.
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- , *Morize, H.* C. R. 127 (1898) 546-.
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- , *Karnożickij, A. N., & Golicyn, (Prince) B. B.* Rs. Ps.-C. S. J. 28 (Ps.) (1896) 88-; J. de Ps. 6 (1897) 606.
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- , *Röiti, A.* Rm. R. Ac. Linc. Rd. 5 (1896) (Sem. 1) 185-.
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- , and mode of propagation. *Gerard, L.* Brux. Ac. Bll. 31 (1896) 280-.
- , — polarisation. *Golicyn, (Prince) B. B., & Karnożickij, A. N.* St. Pét. Ac. Sc. Mm. 3 (1896) No. 6, 13 pp.
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- Frost, E. B.* Science 3 (1896) 235-.
- Gifford, J. W.* Phot. J. 20 (1896) 193-.
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- Hoorweg, J. L.* Amst. Ak. Vs. 4 (1896) 290-; Fsehr. Ps. (1896) (Ab. 2) 632-.
- Imbert, A., & Bertin-Sans, H.* Par. S. Bl. Mm. 48 (1896) (C. R.) 167-.
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- , vision. *Griffiths, M.* *Ph. Mg.* 4 (1834) 43-.
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- , periscopic, geometric form of theoretical retina. *Matthiessen, H. F. L.* *Arch. f. Oph.* 25 (1879) (Ab. 4) 257-.
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- , —, structure and optical phenomena. *Matthiessen, L.* Meckl. Vr. Nt. Arch. (1888) iv-.
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- , —, experimental determination. *Leboucher, —.* Caen Mm. S. L. 13 (1864) No. 4, 26 pp.
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- , —, refractive indices. *Krause, W.* A. C. 45 (1855) 501-.
- Path of rays through eye. *Acqua, P. dell'.* Omodei A. Un. 69 (1834) 524-.
- Spectra of eye and seat of vision. *Griffiths, M.* Ph. Mg. 5 (1834) 192-.

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- Vision, lines of direction. *Knochenhauer, K. W.* Pogg. A. 46 (1839) 248-.
- Vitreous body and aqueous humour, refractive indices. *Cyon, E.* Wien Sb. 59 (1869) (Ab. 2) 101-.

4420 Movements of the Eye. Accommodation.

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- Baehr, G. F. W.* [1870] Amst. Vs. Ak. 5 (1871) (Ntk.) 273-; Arch. Néerl. 5 (1870) 233-; 6 (1871) 127-.
- Hoppe, R.* Arch. Mth. Ps. 61 (1877) 146-.
- Apparent direction of eyes in a portrait. *Wollaston, W. H.* Phil. Trans. (1824) 247-.
- , —, —, *Raymond, G. M.* Chambéry Mm. Ac. Sav. 3 (1828) 109-.
- Centre of motion of eye. *Maxwell, J. C.* [1875] Camb. Ph. S. P. 2 (1876) 365-.
- Fusion-movements of eyes in prism experiments. *Graefe, A.* Arch. f. Oph. 37 (1891) (Ab. 1) 243-.
- Iris movements, mechanics. *Gruenhagen, A.* [1892] Pflüg. Arch. Pl. 53 (1893) 348-.
- , —, theory, mathematical basis. *Rüppell, —.* Arch. f. Oph. 38 (1892) (Ab. 2) 174-.
- Listing's law. *Duane, A.* Arch. Oph. 26 (1897) 497-; Arch. Augenh. 38 (1899) 185-.
- , —, disputed points. *Weiland, C.* Arch. Oph. 28 (1899) 191-; Arch. Augenh. 40 (1900) 359-.
- Movements and binocular perspective. *Böttcher, (Dr.) —.* Arch. f. Oph. 12 (1866) (Ab. 2) 23-.
- , —, conducive to binocular vision. *Schneller, —.* Arch. f. Oph. 38 (1892) (Ab. 1) 71-.
- , —, of lateral decenteration of crystalline lens. *Giraud-Teulon, —.* C. R. 52 (1861) 383-.
- Ocular muscles, axes of rotation. *Wilson, H.* Arch. Oph. 29 (1900) 404-.
- , —, simple tests. *Randall, B. A.* Am. Oph. S. T. (1889) 362-.
- Plane of vision, relative breadth of fusion on raising and depressing. *Schmiedt, W.* Arch. f. Oph. 39 (1893) (Ab. 4) 233-.
- Rotation of eye, effect on projection of retinal images. *Helmholtz, H.* [1864] Heidl. Vh. Nt. Md. 3 (1865) 170-.

ACCOMMODATION.

- Walker, Ez.* Tilloch Ph. Mg. 29 (1807) 340-; 35 (1810) 82-.
- Simonoff, I.* Zach. Cor. 11 (1824) 438-.
- Respighi, L.* [1856] Bologna Mm. Ac. Sc. 8 (1857) 355-.
- Laugier, P. A. E.* C. R. 44 (1857) 841-.
- Jones, T. W.* R. S. P. 10 (1859-60) 380-.
- Tscherning, M.* [1900] Sc. Abs. 4 (1901) 581.
- and age, relation, dioptric curve and formula. *Sous, —.* Bordeaux S. Md. Mm. (1892) 36-.
- apparent, in aphakic long eyes. *Schoute, G. J.* Arch. f. Oph. 48 (1899) 438-.

apparent, in aphakics, and vision in dispersion circles. *Salzmänn, M.* [1899] *Arch. f. Oph.* 49 (1900) 168-.

— proximity of lower of 2 distant double images. *Sachs, M.* *Arch. f. Oph.* 36 (1890) (*Ab. 1*) 193-.

changes in eye. *Tscherning, —.* *Arch. de Pl.* 4 (1892) 158-; 7 (1895) 158-, 181-; *A. d'Ocul.* 122 (1899) 211-.

and convergence in lateral vision. *Koster, W.* *Arch. f. Oph.* 42 (1896) (*Ab. 1*) 140-.

—, significance in perception of depth of visual field. *Arer, M.* *Ph. Stud.* 13 (1898) 116-, 222-.

defective, illusions accompanying. *Sagnac, G.* *Par. S. Ps. Sé.* (1897) 14-.

displacements of lens in, measured subjectively and objectively. *Heine, L.* *Arch. f. Oph.* 44 (1897) 299-.

with disturbance of binocular vision. *Graefe, A.* *Arch. f. Oph.* 35 (1889) (*Ab. 1*) 137-, (*Ab. 4*) 332-.

— — — — (Graefe). *Landolt, E.* *Arch. f. Oph.* 35 (1889) (*Ab. 3*) 265-.

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experiment with 2 pins. *Haldat du Lys, C. N. A. de.* *Nancy Mm. S. Sc.* (1847) 460-.

— — — — *Delarive, A.* *Bb. Un. Arch.* 10 (1849) 300-.

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—, Forbes's. *Haldat du Lys, C. N. A. de.* *Nancy Mm. S. Sc.* (1845) 51-; *C. R.* 20 (1845) 1561-.

external, from muscular compression. *Sattler, H.* *Arch. f. Oph.* 40 (1894) (*Ab. 3*) 239-.

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and magnification. *Strehl, K.* *Cztg. Opt.* 20 (1899) 21.

mechanism. *Tscherning, M. A.* *d'Ocul.* 112 (1894) 121-; *Arch. de Pl.* 6 (1894) 40-.

in optical instruments. *Lallemand, A.* *Mntp. Mm. Ac. Sect. Sc.* 6 (1864-66) 382-.

and play of pupil. *Weidlich, J.* *Arch. Augenh.* 15 (1885) 164-.

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—, and convergence. *Howe, L.* *Am. Oph. S. T.* (1890) 92-.

and spectacle lenses. *Steinheil, A.* *Z. Bl.* 2 (1866) 366-.

subnormal, as cause of asthenopia. *Theobald, S.* *Am. Oph. S. T.* (1891) 127-.

theory. *Hess, C.* *Arch. f. Oph.* 42 (1896) (*Ab. 1*) 288-, (*Ab. 2*) 80-; 43 (1897) 477-; 46 (1898) 440-; 49 (1900) 241-.

— (Hess). *Koster, W.* [1898] *Arch. f. Oph.* 45 (1898) 97-; 47 (1899) 242-.

—, Hess, C., & Heine, L. *Arch. f. Oph.* 46 (1898) 243-.

—, Tscherning's. *Crzellitzer, A.* *Arch. f. Oph.* 42 (1896) (*Ab. 4*) 36-.

unequal, in normal and anisometropic eyes. *Fick, A. E.* [1888] *Arch. Augenh.* 19 (1889) 123-, 196; *Arch. Oph.* 18 (1889) 292-.

4430 Defects of the Eye and their Correction. Short Sight, Astigmatism, Irradiation, etc.

Powell, B. B. A. Rp. (1852) (*pt. 2*) 11.

Howe, L. *Am. S. Mer. P.* (1885) 91-.

Kokemüller, D. *Cztg. Opt.* 7 (1886) 2-.

Aberration. *Henry, C. C. R.* 118 (1894) 1140-.

—, chromatic. *Thompson, S. P. L. Ps. S.* P. 2 (1879) 157-; *Ph. Mg.* 4 (1877) 48-.

—, monochromatic. *Tscherning, M.* *Z. Psychol.* 6 (1894) 456-.

—, —, general theory, and results for ophthalmology. *Gullstrand, A.* [1900] *Ups. S. Sc. N. Acta* 20 (1904) No. 4, 204 pp.

— and sensitiveness. *Henry, C. C. R.* 119 (1894) 794-, 872.

—, spherical. *Meyer, M. H.* *Pogg. A.* 89 (1853) 540-; 96 (1855) 607-.

—, —, *Leroy, C. J. A. C. R.* 116 (1893) 636-.

—, —, correction. *Tscherning, —.* *J. Pl. Pth. Gén.* 1 (1899) 312-.

—, symmetrical (meridional astigmatism). *Jackson, E.* *Am. Oph. S. T.* (1888) 141-.

Abnormal voluntary movements. *Lechner, C. S.* *Arch. f. Oph.* 44 (1897) 596-.

Achromatism. *Powell, B.* [1834] *Ashmol. S. T.* 1 (1838) No. 1, 32 pp.

—, *Provenzani, F. S.* *Rm. N. Linc. At.* 34 (1881) 49-.

—, imperfect. *Leroux, F. P.* *A. C.* 66 (1862) 173-.

Aphakic eyes, length, and correction glasses. *Percival, A. S.* *Arch. Oph.* 26 (1897) 1-; *Arch. Augenh.* 37 (1898) 286-.

Astigmatic eye, form of retinal image. *Koller, C.* *Am. Oph. S. T.* (1892) 425-.

—, pencils of rays, infinitely slender, focal lines, with oblique incidence of homocentric pencils of rays upon curved surface. *Matthiessen, L.* *Arch. f. Oph.* 30 (1884) (*Ab. 2*) 141-.

ASTIGMATISM.

Kayser, E. [1883-84] *Danzig Schr.* 6 (*1884-87) (*Heft 1*) xiv-, (*Heft 2*) xv.

Berlin, —. *Meckl. Vr. Nt. Arch.* (1893) xix-; (1897) i-.

Broca, A. *C. R.* 128 (1899) 450-.

correction. *Heilborn, F.* *Cztg. Opt.* 17 (1896) 61-.

—, *Broca, A. As. Fr. C. R.* (1899) (*Pt. 2*) 283-.

— by cylindrical lenses. *Anderson, T. B. A. Rp.* (1894) 586.

— — — — *Roure, F.* *A. d'Ocul.* 115 (1896) 99-.

— pince-nez. *Motais, —.* *Angers S. Sc. Bll.* (1885) 253-.

— plano-cylindrical lenses. *Hay, G.* *Arch. Oph. Ot.* 5 (1876) 497-.

— — — — *tore lenses.* *Goldzieher, V.* [1893] *Termt. Közl.* 26 (1894) 45; *Mth. Nt. B. Ung.* 11 (1894) 435.

- detection. *Chauvel, J.* Arch. Md. Phm. Mil. 7 (1886) 357-.
- determination. *Halle, G.* D. Nf. Vh. (1897) (Th. 2, Hälfte 1) 124-.
- and keratometry. *Weiland, C.* Arch. Oph. 22 (1893) 37-.
- measurement. *Stokes, G. G.* B. A. Rp. (1849) (pt. 2) 10-.
- , *Bridge, J.* Ph. Mg. 30 (1890) 427-.
- non-perforating corneal lesions as cause. *Lans, L. J.* Arch. f. Oph. 45 (1898) 117-.
- normal irregular. *Exner, S.* Arch. f. Oph. 34 (1888) (Ab. 1) 1-; *Exner Rpm.* 24 (1888) 495-.
- progressive hyperopic. *Jackson, E.* Am. Oph. S. T. (1890) 676-.
- relation to test objects. *Howe, L.* [1885] Mer. S. J. 6 (1886) 147.
- state of eye affected with. *Airy, (Sir) G. B.* [1825-84] Camb. Ph. S. T. 2 (1827) 267-; 8 (1849) 361-; Camb. Ph. S. P. (1866-67) 47-; Camb. Ph. S. T. 12 (pt. 1) (1873) 392-; Camb. Ph. S. P. 5 (1886) 132-.
- subjective symptom. *Fredericq, L.* Liège Lb. Fred. Tr. 3 (1890) 165-.
- theory. *Gullstrand, A.* Arch. Augenh. 23 (1891) (Ber. 1890) 90-.
- , *Dimmer, F.* Arch. f. Oph. 43 (1897) 613-.
- Dioptric defects of eye, influence on astronomical measurements. *Seeliger, H.* Münch. Ak. Ab. 15 (1886) 665-.
- Duplication of object by one eye. *Prevost, P.* A. C. 51 (1832) 210-.
- Effects of gas-flame, electric and solar spectra. *Pickering, W. H.* Nt. 25 (1882) 340-.
- Field of vision, concentric limitation. *Groenouw, —.* Arch. f. Oph. 40 (1894) (Ab. 2) 172-.
- , —, monocular and binocular, in emmetropia. *Asher, L.* Arch. f. Oph. 48 (1899) 427-.
- , —, radial extension, and allometry in indirect vision. *Matthiessen, L.* Arch. f. Oph. 30 (1884) (Ab. 1) 91-.
- Halo seen round all bodies. *Griffiths, M.* Silliman J. 38 (1840) 22-.
- Hemeralopia. *Treitel, T.* Arch. f. Oph. 31 (1885) (Ab. 1) 139-.
- Hypermetropia. *Metzger, E.* Nt. 31 (1885) 506-.
- , latent. *Du Bois-Reymond, C.* [1894] Z. Psychol. 8 (1895) 34-.
- , theory, history. *Schirmer, R.* Arch. f. Oph. 30 (1884) (Ab. 2) 185-.
- Images, double, under what conditions do they appear at unequal distance from observer? *Fröhlich, R.* Arch. f. Oph. 41 (1895) (Ab. 4) 134-.
- , retinal, equality in corrected axile ametropia and in emmetropia. *Lagrange, F.* A. d'Ocul. 111 (1894) 81-, 279-, 400.
- , —, of squinting eye, extinction by binocular vision. *Kugel, L.* Arch. f. Oph. 36 (1890) (Ab. 2) 66-.

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- Joslin, B. F.* [1831] Am. Ph. S. T. 4 (1834) 340-.
- Robinson, T. R.* [1831] As. S. Mm. 5 (1833) 1-.

- Plateau, J. A. F.* [1837-39] Brux. Ac. Sc. Mm. 11 (1838) 112 pp.; Brux. Ac. Bll. 6 (1839) 501-, (Pte. 2) 102-; C. R. 8 (1839) 883-.
- Liebig, J. von.* Lieb. A. 36 (1840) 124-.
- Powell, B.* [1849] Ashmol. S. P. 2 (1854) No. 26, 240-; As. S. Mm. 18 (1850) 69-.
- [*Shortrede non*] *Shortreed, R.* As. S. M. Not. 9 (1848-49) 146-.
- Respighi, L.* Bologna Mm. Ac. Sc. 9 (1858) 513-.
- Ermerins, F. Z.* Ndl. Arch. Ntk. 1 (1865) 498-.
- Moigno, F.* Smiths. Rp. (1866) 211-.
- Leroux, F. P.* C. R. 76 (1873) 960-.
- Birkenmajer, L.* (xii) Kosmos (Lw.) 2 (1877) 530-.
- Plateau, J. A. F.* Brux. Ac. Bll. 48 (1879) 37-.
- Kroužil, J.* Časopis 16 (1887) 31-; Fsch. Ps. (1886) (Ab. 2) 182-.
- diffusion images, experiments. *Bezold, W. von.* A. Ps. C. 138 (1869) 554-.
- of incandescent bodies. *Bequerel, E. C. R.* 57 (1863) 681-.
- lines and images, and use in ophthalmometry and photometry. *Prompt, —.* Sperim. 63 (1889) 453-.
- luminous. *Mazzoli, A.* N. A. Sc. Nt. 3 (1840) 5-; 4 (1840) 34-.
- solar. *Casoni, G.* [1861] Bologna Mm. Ac. 1 (1862) 153-.
- theory. *Trouessart, —.* Bb. Un. Arch. 20 (1852) 305-.

- Lens, physiology and pathology. *Heine, L.* Arch. f. Oph. 46 (1898) 525-.
- Magnification of right ophthalmoscopic image in ametropes. *Vignes, —.* A. d'Ocul. 113 (1895) 367-.
- Optical glass for rendering near or long sight clear, apparatus for determining. *Schüttén, N. G. af.* [1855] (viii) Helsingf. Öfr. 3 (1856) 61-.
- Refraction anomalies, determination. *Purves, W. L.* Arch. f. Oph. 19 (1873) 89-.
- changes, acquired. *Schoen, W.* Arch. Augenh. 27 (1893) 268-.
- in adolescent and adult eyes. *Feilchenfeld, W.* Arch. f. Oph. 35 (1889) (Ab. 1) 113-.
- — — —, and asthenopia. *Norris, W. F.* Am. Oph. S. T. (1886) 369-.
- , Cuignet's method of examining. *Weiss, G.* Par. S. Ps. Sé. (1891) 169.
- , decrease from loss of lens. *Salzmann, M.* Arch. Augenh. 34 (1897) 152-, 297.

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- and construction of eye. *Schmidt-Rimpler, H.* Arch. f. Oph. 35 (1889) (Ab. 1) 200-.
- correction of sight in highly myopic aphakics. *Fukala, V.* [1891] Arch. Augenh. 24 (1892) 161-.
- dependence on orbital structure, and relations of conus to refraction. *Seggel, —.* Arch. f. Oph. 36 (1890) (Ab. 2) 1-.

examination of myopic eyes by means of inverted images. *Demichieri, L.* A. d'Ocul. 114 (1895) 109-.

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quantitative relations between narrowing of pupil and diminution of short sight. *Weidlich, J.* Arch. Augenh. 15 (1885) 175-; 16 (1886) 124.

treatment. *Förster, —.* [1886] Arch. Augenh. 17 (1887) 91-.

—, and choice of glasses. *Bravais, —.* Arch. Augenh. 22 (1891) (Ber. 1890) 21-.

vision in myopics. *Triepel, H.* Arch. f. Oph. 40 (1894) (Ab. 5) 50-; 41 (1895) (Ab. 3) 139-.

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Zehender, — von. [1888] Arch. Augenh. 19 (1889) 483.

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Breton [de Champ], P. C. R. 42 (1856) 542-; 740-.

bifocal. *Atkinson, J.* (vi Add.) Manch. Ph. S. P. 3 (1862-63) 190-.

—, *Gould, G. M.* Arch. Oph. 18 (1889) 432-.

—, *Percival, A.* Arch. Oph. 19 (1890) 255-.

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—, *Dor, H.* [1892] Lyon S. Sc. Md. Mm. 32 (1893) 118-.

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—, equivalent refraction of two. *Wilson, H.* Arch. Oph. 27 (1898) 19-; Arch. Augenh. 38 (1899) 189-.

—, and special kind of dioptric images. *Koller, C.* Arch. f. Oph. 32 (1886) (Ab. 3) 169-.

—, spherocylindrical, equivalence. *Jackson, E.* Am. Oph. S. T. (1886) 268-.

—, testing. *Imbert, A.* A. d'Ocul. 93 (1885) 243-.

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—, and prismospheres, action. *Percival, A.* Arch. Oph. 20 (1891) 193-; 586.

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— (Wollaston). *Jones, W.* Nicholson J. 7 (1804) 192-.

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—, —, —, *Knapp, H.* Arch. Oph. 20 (1891) 134-; Arch. Augenh. 25 (1892) 134-.

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—, *Walker, Ez.* Nicholson J. 7 (1804) 291-.

—, *Cauchois, —.* J. de Ps. 78 (1814) 305-.

—, *Ostwalt, F.* Arch. f. Oph. 46 (1898) 475-; 47 (1899) 248; 50 (1900) 44-.

—, *Wollaston's.* *Jones, W.* Nicholson J. 8 (1804) 38-.

—, —, *Biot, J. B.* Par. S. Phlm. Bil. 3 (1813) 358-.

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—, linear form. *Hensen, —.* Arch. f. Oph. 41 (1895) (Ab. 3) 258-.

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tilted and decentred, cylindrical and prismatic equivalents. *Holden, W. A.* Arch. Oph. 20 (1891) 1-.

tipped, central refraction through. *Green, J.* Am. Oph. S. T. (1890) 690-.

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—, vision in. *Bielschowsky, A.* Arch. f. Oph. 50 (1900) 406-.

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—, inadequacy of present letters. *Bellarminoff, L.* Arch. Augenh. 16 (1886) 284-.

—, simplification. *Guillery, —.* Arch. Augenh. 23 (1891) 323-.

—, — (Guillery). *Liebrecht, —.* Arch. Augenh. 25 (1892) 37-.

—, — (Liebrecht). *Guillery, —.* [1892] Arch. Augenh. 26 (1893) 80-.

Uveal changes due to age. *Kerschbaumer, R.* Arch. f. Oph. 34 (1888) (Ab. 4) 16-; 38 (1892) (Ab. 1) 127-.

Vision in dispersion circles. *Salzmann, M.* Arch. f. Oph. 39 (1893) (Ab. 2) 83-; 40 (1894) (Ab. 5) 102-.

- Vision, multiple. *Bidwell, S.* Nt. 59 (1898-99) 559-.
- through mist. *Walker, Ez.* Tilloch Ph. Mg. 26 (1806) 29-.
- small hole. *Meslin, G.* J. de Ps. 6 (1887) 341-.
- Visual appearance of luminous bodies at rest and in motion. *Poisson, S. D.* Par. Mm. Ac. Sc. 19 (1845) 311-.

4440 Binocular Vision (Magnitude and Distance of Objects. Relief).

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- Apparent diameter of distant objects. *Ronot, J.* Rv. Sc. 45 (1890) 92-.
- form of sky, determination. *Drobisch, M. W.* Leip. B. (1854) 107-.
- inclination of wooded slopes, over-estimation. *Nies, —.* [1890] Würtb. Jh. 47 (1891) lxvi-.
- motion of pattern in worsted. *Taylor, H.* Ph. Mg. 33 (1848) 345-.
- translucidity. *Mouxy de Loches, (comte) F.* Chambéry Mm. Ac. Sav. 2 (1827) 252-.
- Binocular combinations. *Rogers, W. B.* [1855] Am. Ac. P. 3 (1852-57) 213-.
- upon disparate retinal points. *Hyslop, J. H.* Science 11 (1888) 59-.
- convergence of vision. *Stoerber, —.* Nancy S. Sc. Bil. (1888) 75-.
- effect of monocular stimulation. *Titchener, E. B.* Ph. Stud. 8 (1893) 231-.
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- metamorphopsia. *Lippincott, J. A.* Arch. Oph. 18 (1889) 18-; Arch. Augenh. 23 (1891) 96-.
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- Gherardi, S.* Bologna N. Cm. 1 (1834) 349-.
- Wheatstone, (Sir) C.* Phil. Trans. (1838) 371-.
- Gazzaniga, C. L.* A. Sc. Lomb. Ven. 9 (1839) 235-; 10 (1840) 205-; 11 (1841) 101-, 171-, 212-; 12 (1842) 3-.
- Jones, T. W.* R. S. P. 4 (1840) 198-.
- Wheatstone, (Sir) C.* Phil. Trans. (1852) 1-.
- Rogers, W. B.* Silliman J. 20 (1855) 86-, 204-, 318-; 21 (1856) 80-, 173-.
- Fristiani, P.* Mil. Mm. I. Lomb. 7 (1859) 409-.
- Prevost, A. P.* Bb. Un. Arch. 4 (1859) 105-.
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- Fechner, G. T.* [1860] Leip. Ab. Mth. Ps. 5 (1861) 337-.
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- Eisenlohr, F.* Carlsruhe Vh. Nw. Vr. 2 (1866) 1-.
- Claudet, A. F. J.* R. S. P. 15 (1867) 424-.

- Pictet, R.* [1871] St. Pét. Ac. Sc. Mm. 17 (1872) (No. 11) 79 pp.
- (Pictet.) *Le Conte, J.* Arch. Sc. Ps. Nt. 41 (1871) 394-.
- (Le Conte.) *Pictet, R.* Arch. Sc. Ps. Nt. 43 (1872) 61-.
- Sulzer, —.* [1895] Arch. Sc. Ps. Nt. 1 (1896) 81-.
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- Hering's fall experiment. *Greeff, R.* Z. Psychol. 3 (1892) 21-.
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- , and new stereoscopic method. *Dove, H. W.* Pogg. A. 80 (1850) 446-.
- and retinal images. *Judd, C. H.* Science 7 (1898) 425-.
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- — —. Helmholtz, H. L. F. von. Arch. An. Pl. (Pl. Ab.) (1878) 322-.
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- — —, influence of one eye on other. Gazzaniga, C. L. A. Sc. Lomb. Ven. 4 (1834) 265-, 302-.
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- — —. Helmholtz, H. A. Ps. C. 123 (1864) 158-; Arch. f. Oph. 10 (1864) (Ab. 1) 1-.
- — —. Cellérier, C. St. Pét. Ac. Sc. Mm. 17 (1872) (No. 11) 57-.
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- — —. Franklin, (Mrs.) C. L. [1887] Am. J. Psychol. 1 (1888) 99-.
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- Iridescence of certain beetles. Oppel, J. J. Frkf. Jbr. Ps. Vr. (1858-59) 64-.
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- Luminous beams. Powell, B. B. A. Rp. (1852) (pt. 2) 11-.
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- , apparatus for producing. Rood, O. N. Am. J. Sc. 39 (1865) 260.
- , cause. Wundt, W. Pogg. A. 116 (1862) 627-.
- , Dove's theory, experiments. Rood, O. N. Silliman J. 31 (1861) 339-.
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- , stereoscopic explanation. Oppel, J. J. (vi Add.) Frkf. Jbr. Ps. Vr. (1853-54) 52-; (1854-55) 33-; (1856-57) 56-.
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- , taught by luminous projection. *Gobin, A.* Lyon S. Ag. A. 5 (1882) 115-.
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- — — — — (Zöllner). *Jastrow, J.* Am. J. Psychol. 4 (1892) 381-, 427.
- — — — — (—). *Guye, A. A.* Rv. Sc. 51 (1893) 593-.
- observations. *Mohr, C. F.* Pogg. A. 111 (1860) 638-.
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- —, monocular indirect vision. *Müller, R.* Ph. Stud. 14 (1898) 402-.
- —, region, demonstration of contrast phenomena. *Loeb, J.* Pflüg. Arch. Pl. 60 (1895) 509-.
- Steneographic projection. *Simon, P. L.* Gilbert A. 32 (1809) 57-.
- Stereograms of surfaces, construction. *Maxwell, J. C.* [1868] L. Mth. S. P. 2 (1869) 57-.
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- —, geometrical construction. *Steinhauser, A.* Halle Z. Nw. 36 (1870) 66-.
- —, new form (anaglyphs). *Giltay, J. W.* [1895] Mbl. Nt. (1895-96) 1-, 13-.
- — — — — (—). *Watch, A. F.* Franklin I. J. 140 (1895) 401-.
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- Listing, J. B.* Gött. Nr. (1869) 431-.
- Kohlrausch, F.* Gött. Nr. (1870) 415-; A. Ps. C. 143 (1871) 144-.
- Righi, A.* N. Cim. 14 (1875) 55-.
- Helmholtz, H. L. F. von.* L. Ps. S. P. 4 (1881) 260-; Ph. Mg. 11 (1881) 507-.
- Himes, C. F.* N. Y. Ac. T. 1 (1881-82) 114-.
- Hoppe, J.* Pflüg. Arch. Pl. 40 (1887) 523-.
- Stevens, W. Le C.* Science 9 (1887) 14.
- Anderson, W. W.* Science 9 (1887) 56.
- Jastrow, J.* Science 7 (1898) 615-.
- Grützner, —.* [1899] Würtb. Jh. 56 (1900) lv-.
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- — —. *Pratt, W. H.* Science 8 (1886) 631-.
- illusion. *Monro, C. J.* [1864] Ph. Mg. 29 (1865) 15-.
- by optic divergence. *Stevens, W. Le C.* Am. J. Sc. 22 (1881) 358-, 443-.
- phenomena. *Dove, H. W.* B. A. Rp. (1854) (pt. 2) 9-.
- *Cima, A. N.* Cim. 6 (1857) 185-; C. R. 45 (1857) 664.
- *August, F.* Pogg. A. 110 (1860) 582-.
- *Meyer, O. E.* Bresl. Schl. Gs. Jbr. (1895) (Ab. 2a) 4.
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- *Donders, F. C.* (xii) Amst. Ak. Wet. P. (1872-73) (No. 7) 8-.
- *Hugel, T.* Carl Rpm. 13 (1877) 268-.
- with exact relief. *Cazes, L.* Par. S. Ps. Sé. (1895) 124-.
- and photography, applications. *Mach, E.* Wien Sb. 54 (1866) (Ab. 2) 123-.
- radiographic. *Chabaud, V.* Par. S. Ps. Sé. (1898) 154-.
- — *Lambertz, —.* [1900] Fsechr. Röntgenstr. 4 (1900-01) 1-.

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- of landscapes with normal and abnormal adjustment of eyes. *Müller, Alex.* Pogg. A. 86 (1852) 147-.

— objects with converging lines, inversion. *Hoppe, —.* Pfüg. Arch. Pl. 43 (1888) 295-.

— single and double. *Lathrop, S. P.* Silliman J. 7 (1849) 343-.

— — —, and illusion as to distance. *Locke, J.* Silliman J. 7 (1849) 68-.

— — —, stereoscopic study. *Wyld, R. S.* Edinb. R. S. P. 8 (1875) 505-.

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— — — objects. *Sorel, G.* Rv. Sc. 45 (1890) 564-.

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- Maxwell, J. C.* Ph. Mg. 14 (1857) 40-.
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- Colorimeter. *Hosvay, L.* [1892] *Termt. Közl.* 25 (1893) 158-; *Mth. Nt. B. Ung.* 11 (1894) 426.
- , complementary. *Müller, Alex.* *Erdm. J. Pr. C.* 66 (1855) 193-; *Fresenius Z.* 2 (1863) 143-.
- , detached, and colorimetry. *Mills, E. J.* *Ph. Mg.* 7 (1879) 437-.
- , portable. *Mills, E. J.* *Glasg. Ph. S. P.* 10 (1877) 310-.
- Colour box, experiments with Lord Rayleigh's. *Schuster, A.* [1890] *R. S. P.* 48 (1891) 140-.
- change apparatus. *Hessel, J. F. C.* *Pogg. A.* 79 (1850) 442-.
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- and distance, relation between perception. *Rood, O. N.* *Silliman J.* 32 (1861) 184-.
- map, construction. *Baily, W.* [1892] *L. Ps. S. P.* 11 (1892) 323-; 12 (1894) 1-; *Ph. Mg.* 33 (1892) 496-; 35 (1893) 46-.
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- , *Hoffert, H. H. L.* *Ps. S. P.* 6 (1885) 200-; *Ph. Mg.* 18 (1884) 81-.
- , *Aitken, J.* *Edinb. R. S. P.* 13 (1886) 122-.
- , new Helmholtz. *Schmidt, F., & Haensch,* —. *Z. Instk.* 13 (1893) 200-.
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- calculation. *Lommel, E.* *Münch. Ak. Ab.* 17 (1892) 491-.
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- , *Preyer, W. T.* *Bonn. Cor.-Bl. NH. Vr.* (1868) 57-.
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- law. *König, W.* *Frkf. a. M. Ps. Vr. Jbr.* (1897-98) 35-.
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- , —. *König, A.* *Berl. Ak. Sb.* (1887) 311-.
- , —. *Tonn, E.* *Z. Psychol.* 7 (1894) 279-.
- , —, in green blindness. *Brodhun, E. Z. Psychol.* 5 (1893) 323-.
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- systems. *Donders, F. C.* [1880-84] *Utr. Oz.* 6 (1881) 79-; 8 (1883) 1-; *Arch. f. Oph.* 30 (1884) (*Ab. 1*) 15-.
- , *Rood, O. N.* [1891] *Am. J. Sc.* 44 (1892) 263-.
- , *Kries, J. von.* *Z. Psychol.* 13 (1897) 241-, 473.
- , dichromatic. *Donders, F. C.* [1878] (xii) *Amst. Ak. Wet. P.* (1878-79) *No. 6*, 3-.
- , —. *König, A.* *A. Ps. C.* 22 (1884) 567-.
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- , trichromatic. *Kries, J. von.* *Z. Psychol.* 19 (1899) 63-.
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—, — (Challis). *Stokes, G. G.* Ph. Mg. 12 (1856) 421-.
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—, — (Helmholtz). *Plateau, J. A. F.* Pogg. A. 88 (1853) 172-.
—, —, with reference to mixtures of blue and yellow light. *Maxwell, J. C. B. A. R.* (1856) (pt. 2) 12-.
—, —, and relations of colours of spectrum. *Maxwell, J. C.* Phil. Trans. (1860) 57-; R. S. P. 10 (1859-60) 484-.
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—, — (Unger). *Plateau, J. A. F.* Pogg. A. 88 (1853) 172-.
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- Davies, J. A.* [1861] Edinb. N. Ph. J. 15 (1862) 187-
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 —, *Frey, M. von, & Kries, J. von.* Arch. An. Pl. (Pl. Ab.) (1881) 336-
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- Leucoscope for testing. *König, A.* A. Ps. C. 17 (1882) 990-.
- Light and colour in direct and indirect vision. *Charpentier, A., & Landolt, E.* C. R. 86 (1878) 495-.
- , —, measurement. *Lovibond, J. W.* Mer. S. J. (1893) 275-.
- , —, sensations, relation between intensity. *Henry, C.* C. R. 115 (1892) 811-.
- , —, theory. *Kries, J. von, & Brauneck, —.* Arch. An. Pl. (Pl. Ab.) (1885) 79-.
- , —, —. *Wundt, W.* Ph. Stud. 4 (1888) 311-.
- , —, —. *Franklin, (Mrs.) C. L.* [1892-98] J. H. Un. Cir. [12 (1892-93)] 108-; Science 22 (1893) 80-; Nt. 49 (1893-94) 394; Am. As. P. (1898) 473-.
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- Optics of trichromatic photography. *Ives, F. E.* [1900] Phot. J. 25 (1902) 99-.
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- (Living.) *Benham, C. E.* [1894] Nt. 51 (1894-95) 200.
- (Benham.) *Living, G. D.* [1894] Nt. 51 (1894-95) 200.
- Abney, (Capt.) W. de W.* Nt. 51 (1894-95) 292.
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- Turner, D.* [1895] Sc. S. Arts T. 14 (1898) 50-.
- (Benham.) *Vogel, H. W.* Berl. Ps. Gs. Vh. (1895) 45-.

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Ac. (1856-57) 143.—
—, explanation. *Bartels*. *C. M. N.* Oken
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—, multiple, in one eye. *Eval'rd*, *T. T.* (χ_{II})
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—, retinal, experiment showing reality. *Rogers*,
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—, —, primary, secondary, and tertiary, with
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—, —, —, —, —, —, — (Bossha).
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eye itself. *Lovering*, *J.* *Am. As. P.* (1853)
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— in indirect vision. *Kirschmann*, *A.*
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— *Zeeman, P.* Amst. Ak. Vs. [1] (1893) 154-; *Z. Psychol.* 6 (1894) 233-.

— sensation, intensity. *Henry, C.* C. R. 122 (1896) 1139-, 1232.

Optical estimation of reflections from spectacle glasses. *Szili, A.* Arch. f. Oph. 38 (1892) (Ab. 4) 12-.

Penetrating power of eye, and size of retinal elements. *Meelin, G. J.* de Ps. 1 (1892) 74-.

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—, pseudo-entoptic. *Laqueur, L.* Arch. f. Oph. 36 (1890) (Ab. 1) 62-.

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— (Montigny). *Plateau, J. A. F.* [1852]

Moigno Cosmos 2 (1852-53) 18-.

— *Moigno, F.* Smiths. Rp. (1866) 211-.

— *Tobin, T. W.* Franklin I. J. 78 (1879) 330-.

— *Charpentier, A.* C. R. 114 (1892) 1180-.

— *Berget, —.* Par. S. Ps. Sé. (1893) 283.

—, experiments. *Gariel, C. M.* Par. S. Ps. Sé. (1876) 201-.

— *Marbe, K.* Ph. Stud. 9 (1894) 384-.

—, — with alternating current machine. *Ritter, W.* Z. Psychol. 11 (1896) 310-.

—, —, principle of the thaumatrope. *Jeffries, B. J.* Am. Oph. S. T. 5 (1869) 98-.

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— for various wave-lengths. *Allen, F.* Ps. Rv. 11 (1900) 257-.

Polarising structure of eye. *Brewster, (Sir) D. B. A.* Rp. (1850) (pt. 2) 5-.

Prismatic colour-phenomena without a prism. *Mollweide, C.* Gilbert A. 17 (1804) 328-.

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Purkinje's phenomenon. *Nicati, W., & Macé de Lépinay, J.* J. de Ps. 1 (1882) 53-.

— *Hering, E.* Pflüg. Arch. Pl. 60 (1895) 519-.

— *Sherman, F. D.* Ph. Stud. 13 (1898) 434-.

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— — — produce light sensation. *Charpentier, A.* C. R. 88 (1879) 189-.

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— — — *Vieth, G. U. A.* Gilbert A. 19 (1805) 187-, 371-; 22 (1806) 102-.

— — — *Sartorius, G. C.* Voigt Mg. 11 (1806) 529-.

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- , —. *Rood, O. N.* Am. J. Sc. 13 (1877) 32-.
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- and sun corona. *Randolph, R.* Science 8 (1886) 566.
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- , — and measuring. *Prentice, C. F.* A. d'Ocul. 108 (1892) 5-.
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- — —, apparatus for. *Pfaundler, L.* *Wien Sb.* 68 (1873) (4) 424-.
- — —, —. *Stöhrer, E. (jun.).* *A. Ps.* *C.* 158 (1876) 615-.
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- nature. *Mayer, A. M.* Nt. 18 (1878) 571-, 594-, 648-.
- normal. *Savart, F.* A. C. 36 (1827) 187-.
- phenomena explained by. *Landur, N.* Presse Sc. 1 (1863) 157-.
- of plates and other solids, air in organ pipes, etc. *Chladni, E. F. F.* J. de Ps. 68 (1809) 246-.
- produced by heat. *Resti-Farrari, G.* A. Sc. Lomb. Ven. 4 (1834) 147-.
- small, of gases, theory. *Challis, J.* [1829] Camb. Ph. S. T. 3 (1830) 269-.
- of solids. *Savart, F.* A. C. 25 (1824) 12-, 138-, 225-.
- *Navier, C. L. M. H.* Par. S. Phlm. Bll. (1825) 178-.
- *Röhrs, J. H.* [1864] Camb. Ph. S. T. 11 (1871) 324-.
- *Guthrie, Fred.* Ph. Mg. 9 (1880) 15-.
- of solids (homogeneous and isotropic). *Tedone, O.* Tor. Ac. Sc. Mm. 47 (1897) 181-.
- — — effect of internal friction. *Hopkinson, J.* Mess. Mth. 5 (1871) 208-.
- — — various media on frequency. *Savart, F.* A. C. 30 (1825) 264-.
- — — in fluids. *Koláček, F.* Wien Ak. Sb. 87 (1883) (Ab. 2) 1147-.
- — — and liquids, forms. *Decharme, C.* [J.] C. R. 86 (1878) 453-; 87 (1878) 251-, 354-, 551; 88 (1879) 553-; (XII) M.-et-L. S. Ac. Mm. 36 (1881) 1-, 275-.
- sonorous, of air. *Wertheim, G.* C. R. 32 (1851) 14-; A. C. 31 (1851) 385-.
- of sonorous bodies. *Poisson, S. D.* A. C. 36 (1827) 86-.
- — — damping by air. *Bourget, J.* C. R. 72 (1871) 560-.
- sonorous, of liquids. *Cagniard-Latour, C.* [1833-39] A. C. 56 (1834) 252-, 280-; Par. S. Phlm. PV. (1836) 46-; (1839) 95-.
- — — solids. *Cagniard-Latour, C.* Par. S. Phlm. PV. (1839) 113-.
- theory, simplification. *Cellérier, C.* Arch. Sc. Ps. Nt. 3 (1880) 549-.
- transverse, in liquids. *Dubois, P.* C. R. 86 (1878) 295-.
- — — of sounding liquids and gases. *Matthiessen, L.* A. Ps. C. 141 (1870) 375-.
- in water drops. *Strehlke, F.* Pogg. A. 40 (1837) 146-.
- of water in tubes. *Dvořák, V.* Wien Ak. Sb. 71 (1875) (Ab. 2) 315-.
- Water-pipes, singing. *Croft, W. B.* [1894] Nt. 51 (1894-95) 107.
- Waves of finite amplitude, plane and spherical. *Burton, C. V.* L. Ps. S. P. 12 (1894) 161-; Ph. Mg. 35 (1893) 317-.
- — — stationary (theory). *Bezold, W. von.* Münch. Ak. Sb. 7 (1877) 188-.
- — — Bernoulli effect. *Davis, B.* [1900] N. Y. Ac. A. 13 (1900-01) 487-; Am. J. Sc. 10 (1900) 231-.
- — — wire-helix models. *Bongiovanni, G.* Rv. Sc. [Ind.] 30 (1898) 123-.

9105 Mechanical Action of Vibrations (Acoustic Attraction).

Boehm, E. E., & Schellbach, K. H. A. Ps. C. 7 (1879) 1-.

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- Guthrie, Fred.* [1869] R. S. P. 18 (1870) 93-; 19 (1871) 35-.
- Thomson, (Sir) W.* Ph. Mg. 41 (1871) 423-.
- caused by velocity, and resulting in vibration. *Smith, Herm.* Nt. 8 (1873) 25-.
- and repulsion. *Guyot, J.* [1834-61] L'I. 2 (*1834) 93; (VII) Cosmos 7 (1870) 145-.
- *Schellbach, C. H.* A. Ps. C. 139 (1870) 670-; 140 (1870) 325-, 495-.

- and repulsion. *Moutier, J.* Par. S. Phlm. Bll. 11 (1874) 32-.
- — — *Dvořák, V.* [1875] Wien Ak. Sb. 72 (1876) (Ab. 2) 213-.
- — — *Martini, T.* (xii) Rv. Sc.-Ind. 11 (1879) 306-.
- — — *Provenzali, F. S.* [1882] Rm. N. Linc. At. 36 (1883) 9-.
- — — of bodies vibrating in fluid media. *Berson, G.* Toul. Ac. Sc. Mm. 5 (1893) 406-.
- — —, and magnetic analogies. *Stroh, A.* Tel. E. J. 11 (1882) 192-, 293-.

- Acoustic repulsion. *Dvořák, V.* A. Ps. C. 3 (1878) 328-.
- — — (*Dvořák*). *Mayer, A. M.* Am. J. Sc. 16 (1878) 27-.
- — — *Rayleigh, (Lord).* Ph. Mg. 6 (1878) 270-.
- Explosives, effect. *Tait, —.* Edinb. R. S. P. 14 (1888) 110-.
- Hydrodynamic-acoustic researches. *König, W.* A. Ps. C. 42 (1891) 353-, 549-; 43 (1891) 43-; 50 (1893) 639-.
- Instrument for measuring intensity of aerial vibrations. *Rayleigh, (Lord).* Ph. Mg. 14 (1882) 186-.
- Longitudinal aerial vibrations excited by transversal. *Stefan, J.* Wien Sb. 61 (1870) (Ab. 2) 491-.
- Quartz fibres. *Boys, C. V.* Nt. 42 (1890) 604-.
- Rotation, acoustic, continuous. *Haberditzl, A.* Wien Ak. Sb. 77 (1878) (Ab. 2) 641-.
- — — due to vibration. *Savart, F.* A. C. 36 (1827) 257-.
- — — — — *Cagniard-Latour, C.* Par. S. Phlm. PV. (1839) 87-.
- Sound radiometer and sound waves. *Dvořák, V.* [1881] Wien Ak. Sb. 84 (1882) (Ab. 2) 702-.
- Vibration and theory of action at a distance. *Eötvös, (bárá) L.* (xii) Mag. Tud. Ak. Éts. 5 (No. 12) (1871) 207-.

- after-strain effects. *Šebuev, G. N.* Kazan S. Nt. (Ps.-Mth.) P. 7 (1899) 374-.
- apparatus for production of stationary waves in. *Lehnbach, A.* A. Ps. C. 23 (1884) 157-.
- — — for studying. *Schwedoff, T.* Par. S. Ps. Sé. (1878) 144.
- beats in. *Maltézos, C. C. R.* 129 (1899) 438-.
- bowed. *Mach, E.* A. Ps. C. 134 (1868) 311-.
- — — *Neumann, Clem.* Wien Sb. 61 (1870) (Ab. 2) 89-.
- — —, harmonics. *Melde, F.* Pogg. A. 114 (1861) 609-.
- — —, theory. *Voigt, W.* Gött. Nr. (1890) 502-.
- carrying cursors. *Duhamel, J. M. C.* C. R. 11 (1840) 15-, 810-; Par. Éc. Pol. J. 29^e cah. (1843) 1-.
- circular vibrations. *Neyreneuf, —.* As. Fr. C. R. (1895) (Pt. 2) 377-; Caen Ac. Mm. (1896) (Pt. 1) 26-.
- compound harmonic vibrations. *Hallock, —.* [1899] N. Y. Ac. A. 12 (1899-1900) 665-.
- elastic, with one end vibrating, motion. *Mercadier, E. C. R.* 77 (1873) 639-, 671-, 1292-, 1366-.
- — — — — (*Mercadier*). *Valérius, H.* C. R. 77 (1873) 1184-.
- — —, hung at one end and cut, wave-motion in. *Niven, C.* [1878] Mess. Mth. 8 (1879) 75-.
- energy. *Grinwis, C. H. C.* As. Fr. C. R. 6 (1877) 317-.
- equation, construction. *Monge, G.* Par. Éc. Pol. J. 8 (1809) 118-.
- experiment. *Mach, E.* [1888] Humb. 9 (1890) 347.
- experiments. *Tyndall, J.* R. I. P. 4 (1866) 685-.
- — — *Melde, F.* A. Ps. C. 21 (1884) 452-; 24 (1885) 497-; 30 (1887) 161-.
- — — (*Melde*). *Elsas, A.* A. Ps. C. 25 (1885) 676-.
- flexible and inextensible, integration of differential equations. *Maggi, G. A.* Mil. I. Lomb. Rd. 19 (1886) 682-.
- — —, motion. *M. QJ.* Mth. 4 (1861) 178-.
- formula for. *Delezenne, —.* Lille Mm. S. (1850) 12-.
- harmonics. *Zantedeschi, F.* Wien SB. 27 (1857) 271-.
- heterogeneous. *Bourget, J.* C. R. 63 (1866) 328-; Par. Éc. Norma. A. 4 (1867) 37-; (ix) Par. Obs. A. 9 (1868) 151-.
- — — *Stefan, J.* Wien Sb. 57 (1868) (Ab. 2) 517-.
- india-rubber, longitudinal vibrations. *Lang, V. von.* Wien Ak. Sb. 108 (1899) (Ab. 2a) 692-.
- — —, transverse vibrations. *Lang, V. von.* Wien Ak. Sb. 107 (1898) (Ab. 2a) 1041-.
- — —, frequency. *Baker, T. J. L.* Ps. S. P. 17 (1901) 107-; Ph. Mg. 49 (1900) 347-.
- influence of elasticity. *Savart, N.* A. C. 6 (1842) 5-; C. R. 14 (1842) 915-.
- — — (*Savart*). *Duhamel, J. M. C.* C. R. 14 (1842) 953-.
- law of tensions. *Williams, H. G.* Nt. 44 (1891) 591-.
- — — vibrations, method of demonstrating. *Bazzi, E.* N. Cim. 22 (1887) 155-.

9110 Vibrations of Strings and Rods. Curved Rods.

STRINGS.

- Young, (Dr.) T.* Phil. Trans. (1800) 106-.
- Thomson, W.* (vi Adds.) Camb. Mth. J. 3 (1843) 257-.
- Seebeck, A.* Leip. Ab. Jablon. Gs. (1846) 129-.
- Behrens, T. H.* [1873] (xii) Schl.-Holst. Nt. Vr. Schr. 1 (1875) 153.
- Krigar-Menzel, O., & Raps, A.* Berl. Ak. Sb. (1891) 613-.
- Æolian harp. *Strouhal, V.* Würzb. Ps. Md. Vh. 12 (1878) 199-.
- — — *Rayleigh, (Lord).* Ph. Mg. 7 (1879) 161-.
- — — *Kohlrausch, W. F.* A. Ps. C. 13 (1881) 545-.

- low tones. *Maurat*, —. C. R. 49 (1859) 512-.
- machine for tracing curves described by points. *Williams-Ellis*, (Rev.) J. C. [1872] (xi) Camb. Ph. S. P. 2 (1876) 256-.
- Melde's experiment (vibrations of cord attached to tuning fork). *Gripou*, É. C. R. 78 (1874) 186-.
- , —. *Lowery*, W. Am. J. Sc. 7 (1874) 493-.
- , —. *Sidgreaves*, W. Nt. 41 (1890) 355-.
- , —, form. *Decharme*, C. J. (xii) M.-et-L. S. Ac. Mm. 36 (1881) 100-.
- merochord. *Krebs*, G. A. Ps. C. 134 (1868) 432-.
- monochord. *Fischer*, E. G. Berl. Gs. Nt. Fr. Mg. 4 (1810) 3-.
- , —. *Coulter*, —. Par. S. Ps. Sé. (1874) 27-.
- , —, adjustment and use. *Weber*, W. E. Pogg. A. 15 (1829) 1-.
- with spiral bridges for representation of all intervals. *Michalitschke*, A. Lotos 42 (1894) 33-.
- motion, under force with varying point of application. *Radaković*, M. Wien Ak. Sb. 108 (1899) (Ab. 2a) 577-.
- moving, stationary wave in. *Procter*, H. R. Nt. 5 (1872) 262-.
- musical. *Southern*, J. Tilloch Ph. Mg. 40 (1812) 333-.
- , —. *Power*, J. (vi Add.) Camb. Mth. J. 1 (1839) 241-.
- periodically loaded, discontinuities connected with propagation of wave-motion along. *Godfrey*, C. Ph. Mg. 45 (1898) 356-.
- plucked. *Krigar-Menzel*, O., & *Raps*, A. Berl. Ak. Sb. (1893) 509-.
- and bowed, vibratory forms. *Lindemann*, C. L. F. [1879] Freiburg B. 7 (1880) 500-.
- problem. *Morera*, G. Tor. Ac. Sc. At. 23 (1887-88) 402-.
- production of stationary waves in. *Melde*, F. Pogg. A. 109 (1860) 193-; 111 (1860) 513-.
- projection of true form. *Puluj*, J. Wien Ak. Sb. 95 (1887) (Ab. 2) 355-.
- "rattling" notes (Chladni's "Klirrtöne"). [Nörremberg non] *Nörrenberg*, —. Pogg. A. 9 (1827) 488-.
- (Klirrtöne). *Seebeck*, A. Pogg. A. 40 (1837) 539-.
- and rods, elastic. *Osorio*, R. G. Coimbra I. 3 (1855) 59-, 105-; 5 (1857) 213-.
- , —, longitudinal vibrations. *Chladni*, E. F. F. Voigt Mg. 1 (1797) 7-.
- , —, vibrations in resisting media. *Gripou*, É. [1872] (xii) Lille S. Mm. 10 (1873) 255-; (vii) C. R. 75 (1872) 425-.
- sonometer, electric. *Blyth*, J. [1880] Edinb. R. S. P. 11 (1882) 28.
- stiff, tones. *Seebeck*, A. Leip. B. 1 (1846-47) 365-.
- stiffness, attachment and amplitude, effects. *Braun*, F. A. Ps. C. 147 (1872) 64-.
- , effects. *Hoppe*, R. A. Ps. C. 140 (1870) 263-.
- stretched. *Fischer*, E. G. [1822] Berl. Ab. (1822-23) 187-.
- , —. *Petzval*, J. [1858] Wien D. 17 (1859) 91-.
- , —. *Harnack*, A. Mth. A. 29 (1887) 486-.
- stretched, acoustic constant. *Dunn*, J. T., & *Grey*, W. J. [1880] Nt. 23 (1881) 146-.
- , bow's action. *Duhamel*, J. M. C. C. R. 9 (1839) 567-; 10 (1840) 855-; Par. Mm. Sav. Étr. 8 (1843) 131-.
- , motion. *Skutsch*, R. A. Ps. C. 61 (1897) 190-.
- , —, solution of problem. *Verdam*, G. J. [1849] Amst. Ts. Ws. Nt. Wet. 3 (1850) 225-.
- , wave-motions. *Barlow*, W. B. A. Rp. (1894) 593.
- struck at $\frac{1}{4}$ th of its length, harmonics. *Hipkins*, A. J. R. S. P. 37 (1884) 363-; 38 (1885) 83-.
- , motion. *Kaufmann*, W. A. Ps. C. 54 (1895) 675-.
- tension of which is a function of time. *Niemöller*, F. Z. Mth. Ps. 25 (1880) 44-.
- theory. *Cagniard-Latour*, C. C. R. 11 (1840) 608-, 1026-; Par. S. Phlm. PV. (1840) 94-, 101-.
- thin, elastic properties, and resistance of air, applications of approximately sinusoidal oscillations of long period to. *Bouasse*, H. Toul. Fac. Sc. A. 11 (1897) F, 76 pp.
- transverse vibrations. *Gripou*, É. C. R. 73 (1871) 1213-; Par. Éc. Norm. A. 2 (1873) 357-.
- , —. *Cornu*, A. C. R. 121 (1895) 281-; As. Fr. C. R. (1895) (Pt. 1) 221-.
- , —. *Guillemin*, A. C. R. 127 (1898) 611-.
- , —, circular, velocity of propagation. *Bongiovanni*, G. Rv. Sc. [Ind.] 30 (1898) 36-.
- , —, influence of elastic forces. *Cardani*, P. Rm. R. Ac. Linc. Rd. 4 (1888) (Sem. 1) 524-, 705-, 818-, (Sem. 2) 105-.
- , —, propagation, verification of formula. *Bongiovanni*, G. Rv. Sc. [Ind.] 30 (1898) 20-.
- of variable density. *Radaković*, M. Mh. Mth. Ps. 5 (1894) 193-.
- velocity of vibrations. *Abt*, A. (xii) Mag. Tud. Ak. Éts. 11 (No. 9) (1877) 129-; (ix) A. Ps. C. 2 (1877) 422-.
- vibrations due to tuning fork. *Gripou*, É. C. R. 75 (1872) 201-.
- violin-. *Plassiard*, —. As. Fr. C. R. (1874) 192-.
- , stretched. *Weber*, H. Braunsch. Vr. Nt. Jbr. (11) (1899) 100-.

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- analyses. *Sang*, E. Edinb. N. Ph. J. 12 (1832) 308-.
- elastic, motion under action of liquid jet. *Duhamel*, J. M. C. C. R. 56 (1863) 277-.
- elasticity and change of volume. *Cagniard-Latour*, C. Edinb. J. Sc. 8 (1828) 201-.
- electromagnetically excited, motion. *Klinkert*, G. A. Ps. C. 65 (1898) 849-.
- methods of exciting. *Oosting*, H. J. Mbl. Nt. (1886) 33-.
- platinum, traversed by intermittent current. *Argyropoulos*, T. C. R. 111 (1890) 525.
- telegroph, sounds of. *Delarive*, A. Bb. Un. Arch. 2 (1846) 394-.

telegraph, sounds of (Delarive). *Bellani, A.* (vi Adds.) *Majocchi A. Fis. C. 24* (1846) 271-.

—, —, —. *Du Moncel, T. Fr. S. Mét. An. 4* (*1856) Pt. 2, 71-.

—, —, —. *Besnou, —, & Castel, —. Fr. Cg. Sc. 27* (1860) 359-.

—, —, —. *Kahl, E. Z. Mth. Ps. 10* (1865) 88, 336.

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—, period and logarithmic decrement. *Thompson, J. O. Ps. Rv. 8* (1899) 141-.

wire spiral spring, propagation of gradual stretching in. *De La Rive, L. Arch. Sc. Ps. Nt. 6* (1898) 380-; *C. R. 128* (1899) 415-.

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bar, circular, longitudinal vibrations. *Chree, C. Q.J. Mth. 21* (1886) 287-.

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— and prisms, longitudinal vibrations. *Peyré, J. M. M. Seine-et-Oise Mm. (1835) 27-.*

—, solid or hollow, longitudinal vibrations. *Chree, C. [1898] L. Ps. S. P. 16* (1899) 304-; *Ph. Mg. 47* (1899) 333-.

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—, free and weighted, longitudinal vibrations. *Hugoniot, —, & Sébert, H. C. R. 95* (1882) 775-.

—, longitudinal vibrations. *Stefan, J. Wien Sb. 55* (1867) (*Ab. 2*) 597-.

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—, thin, equilibrium and motion. *Kirchhoff, G. Crelle J. 56* (1859) 285-.

—, transverse vibrations. *Stefan, J. Wien SB. 32* (1858) 207-.

—, —, — (Stefan). *Lang, V. von. Wien SB. 34* (1859) 63-.

—, —, —. *Mercadier, E. C. R. 98* (1884) 803-, 911-; *Par. S. Ps. S6. (1884) 163-.*

—, —, —, constants. *Lang, V. von. Pogg. A. 103* (1858) 624-.

—, —, —, nodes. *Strehlike, F. Pogg. A. 27* (1833) 505-; 28 (1833) 512-.

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—, —. *Chree, C. Q.J. Mth. 23* (1889) 317-.

—, —, lecture experiments. *Campanile, F. N. Cim. 35* (1894) 222-.

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—, —, longitudinal vibrations. *Chladni, E. F. F. Voigt Mg. 1* (1797) 7-.

—, —, vibrations in resisting media. *Gripon, É. [1872] (xii) Lille S. Mm. 10* (1873) 255-; (vii) *C. B. 75* (1872) 425-.

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—, —, —, motion of elastic bodies on. *Kundt, A. A. Ps. C. 126* (1865) 513-.

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—, —, —, —, mathematical theory. *Meyer zur Capellen, F. A. Ps. C. 33* (1888) 661-.

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— — — — — *Thiry, —.* [1889] Z. Ohrh. 20 (1890) 72-; Arch. Ot. 19 (1890) 311-.

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— *Thompson, S. P. L.* Ps. S. P. 8 (1887) 72-; Ph. Mg. 22 (1886) 216-.

— *Gregory, W. G. L.* Ps. S. P. 10 (1890) 288-; Ph. Mg. 28 (1889) 490-.

— *Jones, J. V.* Nt. 44 (1891) 455.

—, construction, and use as interrupter. *Mercadier, E.* A. Tél. 1 (1874) 51-; 3 (1876) 105-.

—, and excitement of vibrations in strings. *Lovering, J.* Am. As. P. 17 (1868) 103-.

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—, of variable period: use as chronograph, tonometer, or interrupter. *Mercadier, E.* C. R. 79 (1874) 797-, 863-.

—, — — — — — pitch. *Neessen, F.* Berl. Ps. Gs. Vh. (1886) 115-; (1887) 27; Elekttech. Z. 8 (1887) 188-.

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imperfections, Earl Stanhope's alleged. *Donovan, M.* [1871] Ir. Ac. P. 1 (1870-74) 238-.

in incompressible fluid, pitch. *Auerbach, F.* A. Ps. C. 3 (1878) 157-.

and interference, experiment. *Wylie, J.* Nt. 55 (1896-97) 508.

intermitting, tones of secondary noise. *Berthold, E.* Arch. Ot. 8 (1879) 250-.

laws. *Mercadier, E.* C. R. 79 (1874) 1001-, 1069-; 83 (1876) 800-, 822-.

— *Stefanini, A. N.* Cim. 26 (1889) 157-, 193-; 27 (1890) 5-, 97-.

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octave from. *Rayleigh, (Lord).* Ph. Mg. 3 (1877) 460-.

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overtones. *Henrici, F. C.* Pogg. A. 58 (1842) 265-.

pitch, variation due to magnetisation. *Pierpaoli, N.* Rm. R. Ac. Linc. Rd. 3 (1894) (Sem. 2) 368-.

rotating, tones. *Beetz, W.* A. Ps. C. 128 (1866) 490-; 130 (1867) 313-.

—, — (Beetz). *Foster, G. C.* Ph. Mg. 32 (1866) 539.

stroboscopic apparatus. *Ettingshausen, A. von.* A. Ps. C. 156 (1875) 337-.

and tuning fork experiments. *Kiesselbach, —.* Arch. Ohrh. 32 (1891) 265-.

of variable pitch. *König, R.* A. Ps. C. 157 (1876) 621-.

vibration in magnetic field, variation. *Maurain, —.* C. R. 121 (1895) 248-; Éclair. Élect. 4 (1895) 452-.

9120 Vibrations of Membranes and Plates. Curved Plates. Bells.

MEMBRANES.

Savart, F. Par. S. Phlm. Bll. (1822) 90-.

Rayleigh, (Lord). [1873] (xi) L. Mth. S. P. 5 (1873-74) 9-.

Neyreneuf, —. A. C. 13 (1888) 271-.

Circular membranes, vibratory motion. *Bourget, J.* C. R. 59 (1864) 889-; Par. Éc. Norm. A. 3 (1866) 55-.

— and square membranes, forced vibrations. *Elsas, A.* Ac. Nt. C. N. Acta 45 (1884) 1-.

Conjugate functions, application. *Routh, E. J.* L. Mth. S. P. 12 (1880-81) 73-.

Definition of the simple solution. *Mathieu, É. L.* C. R. 86 (1878) 962-.

Effect of tension. *Hartshorn, G. F.* [1880] Am. Ac. P. 16 (1881) 56-.

Elastic bodies, equilibrium and motion. *Poisson, S. D.* [1828] Par. Mm. Ac. Sc. 8 (1829) 357-, 623-.

— membranes. *Bernard, F., & Bourget, —.* C. R. 51 (1860) 322-.

—, acoustic figures on. *Savart, F.* [1822] A. C. 26 (1824) 5-.

—, circular, vibratory motion. *Pagani, G. M.* Quetelet Cor. Mth. 5 (1829) 227-; 6 (1830) 25-.

—, vibratory motion. *Bourget, J.* [1870] (ix) Par. S. Phlm. Bll. 7 (1871) 118-.

Elliptic membranes and plates. *Barthélemy, A.* Toul. Ac. Sc. Mm. 9 (1877) 175-.

—, vibratory motion. *Mathieu, É.* Liouv. J. Mth. 13 (1868) 137-; C. R. 66 (1868) 530-.

Equation. *Poincaré, H.* C. R. 118 (1894) 447-.

—, partial differential. *Picard, É.* C. R. 117 (1893) 502-.

Kettledrums. *Rayleigh, (Lord).* Ph. Mg. 7 (1879) 159-.

Liquid films. *Barthélemy, A.* A. C. 1 (1874) 100-.

- Liquid films, figures produced by sonorous vibrations. *Taylor, S. R. S. P. 27* (1878) 71-; Nt. 17 (1878) 426-.
- , transverse vibrations. *Melde, F. E. A. Ps. C. 159* (1876) 275-.
- on vibrating body, ripples. *Schneebeli, H. Zür. Vjschr. 15* (1870) 324-.
- , vibratory forms. *Decharme, C. [J.] [1880-81] C. R. 91* (1880) 625-, 666-; (xii) Amiens Ac. Mm. 8 (1882) 117-.
- Membrane consisting of 2 rectangular heterogeneous strips. *Kozłowski, M. Krk. Ak. (Mt.-Prz.) Rz. 3* (1891) 187-; Cre. Ac. Sc. Bll. (1891) 103-.
- Membranes with principal tensions. *Aulinger, E. Wien Ak. Sb. 95* (1887) (Ab. 2) 170-.
- Modes of division. *Savart, F. A. C. 32* (1826) 384-.
- — (Savart). *Weber, W. E. Schweigger J. 50* (=Jb. 20) (1827) 176-.
- Nodal systems. *Rizzi, G. Nap. Ac. At. 8* (1897) No. 6, 34 pp.
- Phoneidoscope and vibrations of film. *Baily, W. L. Ps. S. P. 4* (1881) 20-; Ph. Mg. 10 (1880) 79-.
- Problem. *Le Roy, —. C. R. 123* (1896) 1258-.
- Soap bubbles, vibration forms. *Decharme, C. J. [1879] (xii) M.-et-L. S. Ac. Mm. 36* (1881) 139-; (ix) C. R. 89 (1879) 570-.
- Sound colour-figures. *Taylor, S. Nt. 17* (1878) 426-.

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- Haily, R. J. J. de Ps. 86* (1817) 125-; 88 (1819) 125-.
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- Mathieu, E. Liouv. J. Mth. 14* (1869) 241-.

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- Örsted, H. C. Bb. Brit. 30* (1805) 364-; Gehlen J. 3 (1807) 544-; Kiøb. Dn. Vd. Selsk. Skr. 5 (1807-08) (hft. 2) 31-; Gehlen J. 8 (1809) 223-.
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- Chladni, E. F. F. Pogg. A. 5* (1825) 345-.
- Faraday, M. Phil. Trans. (1831) 299-.*
- Burg, P. van der. Pogg. A. 103* (1858) 620-.
- Strehlke, F. A. Ps. C. 146* (1872) 319-.
- Antolik, K. [1890] Mag. Tud. Ak. Étk. (Termt.) 20* (1891) No. 4, 31 pp.; Mth. Nt. B. Ung. 8 (1891) 285-.
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- Chladni's. Wheatstone, (Sir) C. Phil. Trans. (1833) 593-.*
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- , electrical aspect. *Örsted, H. C. Voigt Mg. 9* (1805) 31-.
- , — (Örsted). *Ritter, J. W. Voigt Mg. 9* (1805) 33-.
- , lantern demonstration. *Cheyney, J. S. Am. J. Sc. 46* (1868) 243-.

- Chladni's, and patterns of liquids on vibrating plates. Decharme, C. [J.] C. R. 88* (1879) 553-; (xii) M.-et-L. S. Ac. Mm. 36 (1881) 1-, 275-.
- , — Wheatstone's method. *Malavasi, L. Mod. Ac. Sc. Mm. 6* (1888) 125-; 8 (1892) 3-.
- on square plate. *Strehlke, F. Pogg. A. 18* (1830) 198-.
- — of liquid. *Matthiessen, H. F. L. Z. Mth. Ps. 21* (1876) 38-.
- Wheatstone's, theory. König, R. A. Ps. C. 122* (1864) 238-.
- , — *Schubring, G. Halle Z. Nw. 29* (1867) 118-, 205-.
- Air, circular plate. *Vierth, E. H. A. Ps. C. 138* (1869) 560-.
- plates. *Kundt, A. Zür. Vjschr. 13* (1868) 317-; A. Ps. C. 137 (1869) 456-.
- , square plates. *Kundt, A. A. Ps. C. 150* (1873) 176-, 337-.
- Antinodes. *Decharme, C. C. R. 100* (1885) 984-.
- Circular and elliptic plates. *Cabot, F. E. [1879] Am. Ac. P. 15* (1880) 219-.
- perforated plates. *Cabot, F. E. [1879] Am. Ac. P. 15* (1880) 222-.
- plates. *Wertheim, G. C. R. 29* (1849) 361-; A. C. 31 (1851) 5-.
- , — *Kirchhoff, G. C. R. 29* (1849) 753-.
- , — *Resal, H. A. Mines 2* (1872) 226-; C. R. 74 (1872) 171-.
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- plates, laws of vibrations. *Mercadier, E. C. R. 100* (1885) 1290-, 1335-; J. de Ps. 4 (1885) 541-.
- , vibration, investigation of isotropism of solids by. *Mercadier, E. C. R. 105* (1887) 105-.
- Coexistence of vibrations. *Terquem, A. Les Mondes 6* (1864) 81-.
- Communication of vibrations among solids. *Savart, F. [1819] A. C. 14* (1820) 113-.
- Crispations of fluid resting upon vibrating support. *Rayleigh, (Lord). Ph. Mg. 16* (1883) 50-.
- Diaphragms etc., device to increase effect of pulsations. *Cooper, W. B. Franklin I. J. 83* (1882) 459-.
- Elastic plates. *Paradisi, G. Bologna Mm. I. It. 1 (pte. 2) (1806) 393-.*
- , — *Plana, G. Par. Éc. Pol. J. 17^e cah. (1815) 349-, 633-.*
- , — *Strehlke, F. Pogg. A. 95* (1855) 577-.
- , circular. *Kirchhoff, G. Pogg. A. 81* (1850) 258-.
- , —, equilibrium and motion. *Kirchhoff, G. C. R. 27* (1848) 394-; Crelle J. 40 (1850) 51-.
- , clamped. *Lauricella, G. N. Cim. 4* (1896) 134-.
- , —, equation of vibrations. *Lauricella, G. Tor. Ac. Sc. Mm. 46* (1896) 65-.
- , integral of equation of vibrations. *Poisson, S. D. Par. S. Phlm. Bll. (1818) 125-.*

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— — —. *Thiry, —.* [1889] Z. Ohrh. 20 (1890) 72-; Arch. Ot. 19 (1890) 311-.
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—, *Jones, J. V.* Nt. 44 (1891) 455.
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—, and excitement of vibrations in strings. *Lovering, J.* Am. As. P. 17 (1868) 103-.
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—, for showing vibrations. *Duboscq, A.* Par. S. Ps. Sé. (1878) 145-; Les Mondes 49 (1879) 77-.
—, of variable period: use as chronograph, tonometer, or interrupter. *Mercadier, E.* C. R. 79 (1874) 797-, 863-.
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—, and vibration law. *Heerwagen, F.* [1890] Dorpat Sb. 9 (1892) 296-; Dorpat Schr. 6 (1890) 53 pp.
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graphic representation of curves by pendulum. *Hagen, J.* Z. Mth. Ps. 24 (1879) 285-.
imperfections, Earl Stanhope's alleged. *Donovan, M.* [1871] Ir. Ac. P. 1 (1870-74) 238-.
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Vibrations of Membranes 9120

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and tuning fork experiments. *Kiesselbach, —.* Arch. Ohrh. 32 (1891) 265-.
of variable pitch. *König, R.* A. Ps. C. 157 (1876) 621-.
vibration in magnetic field, variation. *Maurain, —.* C. R. 121 (1895) 248-; Éclair. Élect. 4 (1895) 452-.

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— and square membranes, forced vibrations. *Elsas, A.* Ac. Nt. C. N. Acta 45 (1884) 1-.
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— membranes. *Bernard, F., & Bourget, —.* C. R. 51 (1860) 322-.
—, acoustic figures on. *Savart, F.* [1822] A. C. 26 (1824) 5-.
—, circular, vibratory motion. *Pagani, G. M.* Quetelet Cor. Mth. 5 (1829) 227-; 6 (1830) 25-.
—, vibratory motion. *Bourget, J.* [1870] (ix) Par. S. Phlm. Bll. 7 (1871) 118-.
Elliptic membranes and plates. *Barthélemy, A.* Toul. Ac. Sc. Mm. 9 (1877) 175-.
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- Problem. *Le Roy, —.* C. R. 123 (1896) 1258-.
- Soap bubbles, vibration forms. *Decharme, C. J.* [1879] (xii) M.-et-L. S. Ac. Mm. 36 (1881) 139-; (ix) C. R. 89 (1879) 570-.
- Sound colour-figures. *Taylor, S.* Nt. 17 (1878) 426-.

PLATES.

- Haüy, R. J.* J. de Ps. 86 (1817) 125-; 88 (1819) 125-.
- König, R.* C. R. 58 (1864) 562-.
- Radau, R.* Mon. Sc. 6 (1864) 540-.
- Mathieu, É.* Liouv. J. Mth. 14 (1869) 241-.

ACOUSTIC FIGURES.

- Örsted, H. C.* Bb. Brit. 30 (1805) 364-; Gehlen J. 3 (1807) 544-; Kiöb. Dn. Vd. Selsk. Skr. 5 (1807-08) (hft. 2) 31-; Gehlen J. 8 (1809) 223-.
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- Chladni's.* *Wheatstone, (Sir) C.* Phil. Trans. (1833) 593-.
- , *Tomlinson, C.* R. S. P. 33 (1885) 247-.
- , electrical aspect. *Örsted, H. C.* Voigt Mg. 9 (1805) 31-.
- , — (Oersted). *Ritter, J. W.* Voigt Mg. 9 (1805) 33-.
- , lantern demonstration. *Cheyney, J. S.* Am. J. Sc. 46 (1868) 243-.

- Chladni's,* and patterns of liquids on vibrating plates. *Decharme, C. [J.]* C. R. 88 (1879) 553-; (xii) M.-et-L. S. Ac. Mm. 36 (1881) 1-, 275-.
- , *Wheatstone's method.* *Malavasi, L.* Mod. Ac. Sc. Mm. 6 (1888) 125-; 8 (1892) 3-.
- on square plate. *Strehlke, F.* Pogg. A. 18 (1830) 198-.
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- Wheatstone's,* theory. *König, R.* A. Ps. C. 122 (1864) 238-.
- , *Schubring, G.* Halle Z. Nw. 29 (1867) 118-, 205-.

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- perforated plates. *Cabot, F. E.* [1879] Am. Ac. P. 15 (1880) 222-.
- plates. *Wertheim, G.* C. R. 29 (1849) 361-; A. C. 31 (1851) 5-.
- , *Kirchhoff, G.* C. R. 29 (1849) 753-.
- , *Resal, H.* A. Mines 2 (1872) 226-; C. R. 74 (1872) 171-.
- , *Zenneck, J.* A. Ps. C. 66 (1898) 170-.
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- Elastic plates. *Paradisi, G.* Bologna Mm. I. It. 1 (pte. 2) (1806) 393-.
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- , —, equilibrium and motion. *Kirchhoff, G.* C. R. 27 (1848) 394-; Crelle J. 40 (1850) 51-.
- , clamped. *Lauricella, G.* N. Cim. 4 (1896) 134-.
- , —, equation of vibrations. *Lauricella, G.* Tor. Ac. Sc. Mm. 46 (1896) 65-.
- , integral of equation of vibrations. *Poisson, S. D.* Par. S. Phlm. Bil. (1818) 125-.

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 —. *Neyreneuf*, —. Caen Ac. Mm. (1898) (Pt. 1) 16-.
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 —, correction to give true wave-length in. *Blakley, D. J.* Ph. Mg. 7 (1879) 339-.
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 —, propagation of uniform disturbance in gas in. *Sebert*, —, & *Hugoniot*, —. C. R. 98 (1884) 507-.
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- Martens, M. Brux. Ac. Bll. 6 (1839) (pte. 2) 442-.
- Schrötter, A. D. Nf. Vsm. B. (1843) 227-.
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- Schübring, G. Halle Z. Nw. 31 (1868) 69-.
- Terquem, A. C. R. 66 (1868) 1037-.
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- vibroscope study. Töppler, A. A. Ps. C. 128 (1866) 126-.
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- pure tones from. Rayleigh, (Lord). Ph. Mg. 7 (1879) 149-.
- resolution. Smith, F. H. Am. J. Sc. 45 (1868) 421-.
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- from wicks. Rogers, W. B. Silliman J. 26 (1858) 240-.

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- Pinaud, A. [1835-37] L'I. 3 (1835) 366-; Toul. Mm. Ac. 5 (1837-39) 49-.
- Marx, C. M. Erdm. J. Pr. C. 22 (1841) 129-.
- Sondhauss, C. Bresl. Schl. Gs. Übs. (1850) 20-.
- Hofmann, (Dr.) —. Dresden Sb. Isis (1871) 108-.
- Pinaud's experiments, theory. Bourget, J. C. R. 76 (1873) 428-; (ix) Par. S. Mth. Bll. 1 (1873) 87-.
- and vibrations of air in closed pipes of unequal width. Sondhauss, C. Pogg. A. 79 (1850) 1-.
- — — pipes of various forms. Sondhauss, C. A. Ps. C. 140 (1870) 53-, 219-.
- — — — — (Sondhauss). Rayleigh, (Lord). Ph. Mg. 40 (1870) 211-.

- Tones, conditions of production, and whistling and sounding of organ pipes in compressed air. Loewy, A. Arch. An. Pl. (Pl. Ab.) (1899) (Suppl.) 555-.
- Velocity of sound in air in tubes. Kundt, A. Berl. Mb. (1867) 858-; A. Ps. C. 135 (1868) 337-, 527-.
- Waves in compressed gas. Fonseca Benevides, F. da. [1872] (ix) Lisb. J. Sc. Mth. 4 (1873) 36-.

- Whistling. Cagniard-Latour, C. Magendie J. de Pl. 10 (1830) 170-.
- Wind instruments, theory, and motion of gases. Masson, A. C. R. 36 (1853) 257-, 1004-; A. C. 40 (1854) 333-; 48 (1856) 5-.
- — — — — in pipes. Poisson, S. D. [1818-19] Par. Ac. Sc. Mm. 2 (1819) 305-.

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- Everett, J. D. Ph. Mg. 15 (1883) 73-.
- Harmonic vibrations. Rayleigh, (Lord). Ph. Mg. 21 (1886) 369-.
- India-rubber, stretched, longitudinal and transverse vibrations, phase differences. Oosting, H. J. Amst. Ak. Vs. 3 (1895) 262-; Fsch. Ps. (1895) (Ab. 1) 425-.
- — — stroboscopic experiments on vibrations. Oosting, H. J. Amst. Ak. Vs. 4 (1896) 152-; Fsch. Ps. (1895) (Ab. 1) 425-.
- Membranes. Elsas, A. [1882] Ac. Nt. C. N. Acta 45 (*1884) 1-.
- Plates. Elsas, A. A. Ps. C. 19 (1883) 474-; 20 (1883) 468-.
- Strings, production of stationary waves in. Meide, F. Pogg. A. 109 (1860) 193-; 111 (1860) 513-.
- , stretched. Elsas, A. A. Ps. C. 23 (1884) 173-.
- Synchronous vibrations, with very slight damping. Cornu, A. C. R. 104 (1887) 1656-.
- — — stability. Cornu, A. C. R. 104 (1887) 1463-.

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(See also Physiology 3545.)

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- Gough, J. Nicholson J. 10 (1805) 65-.
- Savart, F. A. C. 24 (1823) 56-.
- (Mathematical theory.) Pagani, G. M. Quetelet Cor. Mth. 3 (1827) 145-.
- Meister, —. Pogg. A. 102 (1857) 479-.
- Zantedeschi, F. Wien SB. 25 (1857) 165-.
- (Theory.) Rayleigh, (Lord). [1870] Phil. Trans. 161 (1871) 77-.
- (—.) Stern, S. Wien Sb. 63 (1871) (Ab. 2) 266-.
- Mayer, A. M. Ph. Mg. 48 (1874) 266-, 371-, 445-, 513-; Am. J. Sc. 8 (1874) 241-; 9 (1875) 267-; 12 (1876) 329-; 47 (1894) 1-, 134-.
- Rowland, H. A. Franklin I. J. 69 (1875) 419-.
- Ettingshausen, A. von. Wien Ak. Sb. 79 (1879) (Ab. 2) 215-.
- (Theory.) Koldáček, F. A. Ps. C. 12 (1881) 353-.
- Gilbault, H. C. R. 119 (1894) 53-.
- (Theory.) Johannesson, P. A. Ps. C. 59 (1896) 180-.

- König, W. [1897] Frkf. a. M. Ps. Vr. Jbr. (1897-98) 31-.
- Neyreneuf, —. Caen Ac. Mm. (1899) (Pt. 1) 3-.
- of air columns. Wheatstone, (Sir) C. QJ. Sc. (1828) (Pt. 1) 175-.
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- aperiodic systems. Christiani, A. Arch. An. Pl. (Pl. Ab.) (1879) 363-; (1880) 156-.
- apparatus for studying. Guillaume, C. É. Par. S. Ps. Sé. (1895) 5-.
- of bodies in unison. Gripon, É. J. de Ps. 3 (1874) 273-.
- and brightness of colours of spectrum. Seebeck, A. Pogg. A. 62 (1844) 571-.
- case. Moon, R. Ph. Mg. 43 (1872) 99-.
- McMurtrie, K. Nt. 61 (1899-1900) 445.
- of cavities. Wand, T. A. Ps. C. 4 (1878) 107-.
- Leduc, S. As. Fr. C. R. (1899) (Pt. 1) 220-.
- , theory. Stern, S. Wien Sb. 65 (1872) (Ab. 2) 313-.
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- effect of internal friction. Hopkinson, J. Ph. Mg. 45 (1873) 176-.
- — — Auerbach, —. D. Nf. Tbl. (*1878) 40-.
- resonance box and electromagnetic operation on vibrations of tuning forks. Pierpaoli, N. Rm. R. Ac. Linc. Rd. 2 (1893) (Sem. 1) 337-.
- of elastic bodies nearly in unison. Krebs, G. A. Ps. C. 19 (1883) 935-.
- experiment. Puluj, J. Carl Rpm. 14 (1878) 183-.
- (lecture-). Durrant, R. G. Nt. 45 (1892) 415-.
- of jets. Bell, C. A. [1886] Phil. Trans. 177 (1887) 383-.
- liquids. Cagniard-Latour, C. [1833] A. C. 56 (1834) 252-.
- membranes. Wintrich, —. Erlang. Sb. Ps. Md. S. 5 (1873) 1-.
- multiple. Duhamel, J. M. C. C. R. 27 (1848) 456-.
- Antoine, J. A. C. 27 (1849) 191-.
- of musical instruments, experiments. Perrolle, É. Turin Mm. Ac. (1790-91) 195-.
- — — (Perrolle). Nicholson, W. Nicholson J. 1 (1797) 416-.
- with 2 pendulums, apparatus for demonstrating. Oberbeck, A. N.-Vorp. Mt. 19 (1888) 77-.
- phenomenon. Gripon, É. C. R. 92 (1881) 294-.
- phonopore (acoustic telegraph). Collette, A. (jun.) J. Tél. 14 (1890) 73-.
- phonoporic telegraphy (application by synchronous tuning forks). Clark, L. J. Tél. 11 (1887) 62-.
- and similar actions, illustration. Rowland, H. A. Franklin I. J. 64 (1872) 275-.
- sympathetic, of tuning forks. Spice, R. Am. J. Sc. 12 (1876) 411-.

- and synchronism, connection between theories. Cornu, A. C. R. 118 (1894) 313-.
- , phenomena, apparatus for demonstrating. Guillaume, C. É. Par. S. Ps. Sé. (1900) 44*.

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- Wertheim, G. C. R. 32 (1851) 14-; A. C. 31 (1851) 385-.
- (theory.) Grinwis, C. H. C. Arch. Néerl. 8 (1873) 417-; Amst. Vs. Ak. 7 (1873) 217-.
- (—) Rayleigh, (Lord). Ph. Mg. 47 (1874) 419-.
- Rayleigh, (Lord). Ph. Mg. 17 (1884) 188-.
- absorption of sound by. Christiani, A. (xii) Berl. Ps. Gs. Vh. 1 (1882) 104-.
- and other acoustic apparatus. Schubring, G. Halle Z. Nw. 31 (1868) 130-.
- action of waves. Lebedew, P. A. Ps. C. 62 (1897) 158-.
- apparatus for interference of sound. Quincke, G. A. Ps. C. 128 (1866) 177-.
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- brass wind instruments as. Blaikley, D. J. L. Ps. S. P. 2 (1879) 261-; Ph. Mg. 6 (1878) 119-.
- damping. Leiberg, P. Rs. Ps.-C. S. J. 28 (Ps.) (1896) 93-; Fsch. Ps. (1896) (Ab. 1) 468-.
- Pochettino, A. Rm. R. Ac. Linc. Rd. 8 (1899) (Sem. 1) 260-.
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- humming tone and vibration law of cubical pipes. Sondhauss, C. Pogg. A. 81 (1850) 235-, 347-.
- liquid jets as, theory. Kirchhoff, G. Crelle J. Mth. 70 (1869) 289-.
- motion of air in, exhibition. Dvořák, V. Nt. 48 (1893) 13-.
- pendulum in air, waves and resonance due to. Ketteler, E. A. Ps. C. 68 (1899) 74-.
- and siren, use in marine signalling. Genglaire, —. Rv. Mar. et Ocl. 94 (1887) 346-.
- telephonic trumpet, Herz's. Magneville, — de. Lum. Élect. 6 (*1882) 379-.
- tuning fork. Edison, T. A. Am. J. Sc. 18 (1879) 395-.
- unsymmetrical divergence of sound in air. Bosanquet, R. H. M. Ph. Mg. 4 (1877) 125-.
- vibrations of air in open pipes. Helmholtz, H. Heidl. Vh. Nt. Md. (1857-59) 202-; Crelle J. 57 (1860) 1-.
- — — pipes of various forms, and tones from heated tubes. Sondhauss, C. A. Ps. C. 140 (1870) 53-, 219-.

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- (Coalescence of musical sounds.) Young, (Dr.) T. Phil. Trans. (1800) 130-.
- (Theory of compound sounds.) (Young.) Gough, J. Manch. Ph. S. Mm. 5 (1802) 653-.
- (— — —) (Gough.) Young, (Dr.) T. Nicholson J. 2 (1802) 264-.

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- (Theory of compound sounds.) (Young.) *Gough, J.* Nicholson J. 3 (1802) 39-.
- (Phenomena of sound.) (Gough.) *Young, (Dr.) T.* Nicholson J. 3 (1802) 145-.
- (Graveharmonies.) (Young.) *Gough, J.* Nicholson J. 4 (1803) 1-.
- (— — —) (Gough.) *Young, (Dr.) T.* Nicholson J. 4 (1803) 72-.
- (Nature of musical sounds.) (Young.) *Gough, J.* Nicholson J. 4 (1803) 139-.
- (Young versus Gough.) *Vieth, G. U. A.* Gilbert A. 21 (1805) 265-.
- Hällström, G. G.* Pogg. A. 24 (1832) 438-.
- Ohm, G. S.* Pogg. A. 47 (1839) 463-.
- Willigen, V. S. M. van der.* Amst. Vs. Ak. 3 (1855) 115-.
- Helmholtz, H.* Pogg. A. 99 (1856) 497-.
- (Theory.) *Zantedeschi, F.* Wien SB. 25 (1857) 145-.
- Fabri, R.* [1859] Rm. At. 13 (1859-60) 61-.
- Radau, R.* Les Mondes 11 (1866) 529-.
- König, R. A.* Ps. C. 157 (1876) 177-.
- Bauer, K. L. A.* Ps. C. 4 (1878) 516-.
- Preyer, W. T.* Jena. Sb. (1878) lxxiv-.
- Amiel, A.* [1879] (xii) Béziers S. Sc. Bil. 4 (1880) 200-.
- Nicotra, L. J.* de Ps. 10 (1881) 33-.
- (Theory.) *Delsautr, (le père) J.* [1883] (xii) Brux. S. Sc. A. 8 (1884) (Pt. 1) 52-, (Pt. 2) 25-.
- Helmholtz, H. von.* Berl. Ps. Gs. Vh. (1886) 69-.
- Preyer, W.* Berl. Ps. Gs. Vh. (1889) 15-.
- Voigt, W.* Gött. Nr. (1890) 159-.
- (Theory.) *Hermann, L.* Pflüg. Arch. Pl. 49 (1891) 499-.
- Melde, F.* Pflüg. Arch. Pl. 60 (1895) 623-.
- Everett, J. D. L.* Ps. S. P. 14 (1896) 93-; Ph. Mg. 41 (1896) 199-.
- Meyer, M.* Z. Psychol. 11 (1896) 177-.
- Meinong, A., & Witasek, S.* Z. Psychol. 15 (1897) 189-.
- Meyer, M.* Z. Psychol. 20 (1899) 13-.
- Apparatus. *Stumpf, C.* Z. Psychol. 6 (1894) 33-.
- Beat tones, production from 2 vibrating bodies of high frequency which are separately inaudible. *Mayer, A. M.* B. A. Rp. (1894) 573.
- Beats of consonances of form $h:1$. *Bosanquet, R. H. M.* L. Ps. S. P. 4 (1881) 221-; Ph. Mg. 11 (1881) 420-, 492-.
- — — imperfect harmonies. *Thomson, (Sir) W.* Edinb. R. S. P. 9 (1878) 602-.
- , variation of pitch in. *Taylor, S.* Ph. Mg. 44 (1872) 56-.
- Difference tones. *Meyer, M.* Z. Psychol. 16 (1898) 1-.
- — — (Meyer). *Ebbinghaus, H.* Z. Psychol. 16 (1898) 152-.
- — — (Ebbinghaus). *Meyer, M.* Z. Psychol. 16 (1898) 196-.
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- — — *Stumpf, C.* Z. Psychol. 15 (1897) 280-, 354.
- — — *Lipps, T.* Z. Psychol. 19 (1899) 1-.

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- Fusion of tones and consonance. *Meyer, M.* Z. Psychol. 17 (1898) 401-; 18 (1898) 274-.
- — — — — (Meyer). *Stumpf, C.* Z. Psychol. 18 (1898) 294-.
- — — — — with the unmusical. *Stumpf, C.* Z. Psychol. 17 (1898) 422-.
- Intensity of components. *Meyer, M.* Z. Psychol. 17 (1898) 1-.
- Intermittent tones, physical conditions. *Zwaardemaker, H.* Arch. An. Pl. (Pl. Ab.) (1900) (Suppl.) 60-.
- Interrupted tones, blending, apparatus showing. *Mayer, A. M.* Am. J. Sc. 47 (1894) 283-.
- Kirchhoff's principle, model to illustrate. *Hallock, W.* [1899] N. Y. Ac. A. 12 (1899-1900) 620.
- Objective demonstration. *Burton, C. V. L.* Ps. S. P. 13 (1895) 436-; Ph. Mg. 39 (1895) 452-.
- existence of tones. *Rücker, A. W.* B. A. Rp. (1895) 626-.
- — — — —, *Rücker, A. W., & Edser, E. L.* Ps. S. P. 13 (1895) 412-; Ph. Mg. 39 (1895) 341-.
- — — — —, photographic evidence. *Forsyth, R. W., & Sowter, R. J.* R. S. P. 63 (1898) 396-.
- Obliteration of sensation of one sound by simultaneous action on ear of another more intense and lower sound. *Mayer, A. M.* Am. J. Sc. 12 (1876) 329-.
- Origin and perception. *Dennert, H.* [1886] Arch. Ohrh. 24 (1887) 171-.
- Perception of tones, with special reference to phase-differences. *Hermann, L.* Pflüg. Arch. Pl. 56 (1894) 467-.
- Siren and organ-pipe. *Barus, C.* Am. J. Sc. 5 (1898) 88-.
- Solution of problem by law of interference. *Poggendorff, J. C.* Pogg. A. 32 (1834) 520-.
- Subjective combination-tones in light of resonance theory of hearing. *Schaefer, K. L.* Pflüg. Arch. Pl. 78 (1899) 505-.
- — — — — — — — — — (Schaefer). *Meyer, M.* Pflüg. Arch. Pl. 81 (1900) 49-.
- — — — — — — — — — (Meyer). *Schaefer, K. L.* [1900] Pflüg. Arch. Pl. 83 (1901) 73-.
- Summation and combination-tones. *Appunn, A.* A. Ps. C. 42 (1891) 338-.
- Timbre. *König, R. A.* Ps. C. 14 (1881) 369-.
- Variation tones. *Dvořák, V.* Wien Ak. Sb. 70 (1874) (Ab. 2) 645-.
- — — (Dvořák). *Haberditzl, A.* Wien Ak. Sb. 77 (1878) (Ab. 2) 204-.

PROPAGATION OF SOUND.

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- Biot, J. B.* Par. S. Phlm. Bil. 3 (1802) 116-.
- Gilbert, L. W.* Gilbert A. 21 (1805) 437-.
- Hassenfratz, J. H.* A. C. 53 (1805) 64-.
- Haldat du Lys, C. N. A. de.* Nancy Tr. S. Sc. (1813-15) 15-.
- Fröhlich, C. W.* Gilbert A. 58 (1818) 401-.

- Armi, *G. dall'*. *G. Arcad.* 12 (1821) 164-, 321-; 13 (1822) 48-, 221-.
- Laurent, *P. A.* *C. R.* 22 (1846) 80-.
- Strantz, *F. von.* *Bresl. Schl. Gs. Übs.* (1852) 24-.
- Grinwis, *C. H. C.* [1874] *Amst. Ak. Vs. M.* 9 (1876) 75-; *Arch. Néerl.* 10 (1875) 151-.
- Rayleigh, (*Lord*). *Ph. Mg.* 3 (1877) 456-; 7 (1879) 149-; 9 (1880) 278-; 13 (1882) 340-.
- Rink, *H. J.* *Arch. Néerl.* 12 (1877) 262-.
- Decharme, *C.* *C. R.* 88 (1879) 1082-.
- Waals, *J. D. van der.* [1879] (*xii*) *Amst. Ak. Wet. P.* (1879-80) No. 6, 8-; (*xi*) *A. Ps. C. Beibl.* 4 (1880) 531-.
- Allard, *É.* *C. R.* 95 (1882) 1062-.
- Acoustic reversibility. *Tyndall, J. R. S. P.* 23 (1875) 159-.
- Action of accelerating force. *Alencar Silva, O. d'.* *G. Teix. J. Sc.* 14 (1900) 17-, 97-.
- Agency of sound. *Shand, —.* *B. A. Rp.* (1840) (*pt. 2*) 52-; *Sturgeon A. Electr.* 6 (1841) 245-.
- Anomalous propagation. *Gouy, —.* *C. R.* 111 (1890) 910-.
- *Ventosa, V.* [1898] *Ciel et Terre* 19 (1898-99) 1-.
- Apparatus to show non-propagation of sound in vacuum (bell-machine). *Castell, H.* [1888] *Sturgeon A. Electr.* 3 (1888-39) 66-.
- — — — — *Gellio, G.* *Rv. Sc.-Ind.* [24 (1892)] 106-.
- Barometer, effect of sound on. *Englefield, H. C. R. I. J.* 1 (1802) 157-.
- — — — — *Benzenberg, J. F.* *Gilbert A.* 39 (1811) 129-.
- Bell, electromagnetic, application to experiments. *Wilson, G.* [1846] *Edinb. T. Sc. S. Arts* 3 (1851) 120-.
- Bells, sounds in different gases (Chladni's experiments on sounds of organ-pipe in different gases). [*Perrolle non*] *Perolle, É.* *Tilloch Ph. Mg.* 4 (1799) 283-.
- Density of atmosphere, effect of small variation on amplitude of sound-waves. *Holmes, R. Manch. Lt. Ph. S. Mm. & P.* 1 (1888) 18-.
- — — — — *Holmes, R. Manch. Lt. Ph. S. Mm. & P.* 2 (1889) 221-.
- Direction of sound, experiments in judging. *Ikenberry, L. D., & Shutt, C. E.* [1897] *Kan. Un. Q.* 7 (1898) 9-.
- — — — — *Johnson, A. B. Smiths. Misc. Col.* 33 (1888) *Art.* 3, 12-; (*Wash. Ph. S. Bll.* 8 (1885).)
- Discontinuities in propagation of explosive phenomena. *Vieille, P. C. R.* 129 (1899) 1228-; 131 (1900) 413-.
- — — — — *Vieille, —.* *Par. S. Ps. Sé.* (1900) 61-.
- Distance of sound, experiments in judging. *Shutt, C. E.* [1897] *Kan. Un. Q.* 7 (1898) 1-.
- travelled rectilinearly by sound. *Leroux, F. P. A. C.* 12 (1867) 406-.
- Distant cannonade. *Sinclair, W. F.* *Nt.* 56 (1897) 223.
- — — — — *Mostyn, C.* *Nt.* 56 (1897) 248.
- Distant cannonade. *Davison, C.* *Nt.* 62 (1900) 377-.
- — — — — *Mallet, J. W.* *Nt.* 62 (1900) 523.
- explosions, feeling and hearing. *Davison, C.* [1899] *Nt.* 61 (1899-1900) 91-.
- Ear trumpet for use in war. *Prätorius, C. F. A.* *Gilbert A.* 39 (1811) 150-.
- trumpets and stethoscopes, efficiency. *Geigel, R.* *Virch. Arch.* 140 (1895) 165-, 535.
- — — — — *theory. Gough, J. Nicholson J.* 18 (1807) 310-.
- Equations, general, of small motions of molecules of gases, application. *Duhamel, J. M. C.* *C. R.* 55 (1862) 223-.
- — — — — *integration. Parseval, M. A.* [1801] *Par. Mm. Sav. Étr.* 1 (1806) 379-.
- — — — — *Liouville, J. C. R.* 7 (1838) 247-.
- — — — — *Moon, R.* *Ph. Mg.* 46 (1873) 122-.
- Experiments. *Perrolle, É.* *Turin Mm. Ac.* (1790-91) 195-.
- (Perrolle). *Nicholson, W. Nicholson J.* 1 (1797) 416-.
- during siege of Paris. *Lucas, F. C. R.* 75 (1872) 204-.
- Explosions. *Sebert, (le col.) —.* *Par. S. Ps. Sé.* (1888) 35-.
- — — — — *Wolf, W. A. Ps. C.* 69 (1899) 329-.
- Influence of light. *Paroletti, M.* [1805] *Turin Mm. Ac.* (1805-08) 141-.
- — — — — *unequal temperature distribution. Gromeka, I. S. Rec. Mth. (Moscou)* 14 (1890) 283-; *Fsehr. Ps.* (1889) (*Ab.* 1) 563-.
- "The invisible lady." *Pfaff, C. H.* *Gilbert A.* 28 (1808) 244-.
- — — — — *Schmidt, — (Apoth. in Sonderburg).* *Gilbert A.* 29 (1808) 470-.

KINETIC THEORY.

- (Physics of media composed of free and perfectly elastic molecules.) [With introduction by Lord Rayleigh.] *Waterston, J. J.* [1846] *Phil. Trans. (A)* 183 (*1893) 1-.
- Hoorweg, J. L.* *Arch. Néerl.* 11 (1876) 131-.
- Preston, S. T.* *Ph. Mg.* 3 (1877) 441-; 4 (1877) 77; *Nt.* 18 (1878) 253-.
- Lorentz, H. A.* *Amst. Ak. Vs. M.* 15 (1880) 350-; *Arch. Néerl.* 16 (1881) 1-.
- Mees, R. A.* *Amst. Ak. Vs. M.* 15 (1880) 394-; *A. Ps. C. Beibl.* 5 (1881) 244-.
- Watson, (Rev.) H. W.* [1884] *Birm. Ph. S. P.* 4 (1883-85) 242-.
- Hirn, G. A.* *Brux. Ac. Bll.* 11 (1886) 131 (*bis*)-.
- Kruseman, J. Nieuwenhuijzen.* *Haarl. Ms. Teyl. Arch.* 5 (1898) 207-.

- Meteorite, falling, phenomenon. *Mach, E., & Doss, B.* *Wien Ak. Sb.* 102 (1893) (*Ab.* 2a) 248-.
- Motions of atmosphere. *Helmholtz, — von.* *D. Nf. Tbl.* (1889) 199.
- Petroleum wells, sound propagation at bottom. *Ishiwara, —.* *Tök. Gl. S. J.* 5 (1898) [265]-. [*Jap.*]
- Phenomenon of Monte Tomatico, near Feltre. *Haidinger, W.* *Wien Gl. Jb.* 4 (1853) 559-.

- Pitch of sound, alteration by conduction through different media. *Ringer, S. R. S. P. 10* (1859-60) 276-.
- Potential with 4 variables, application to theory of sound; proof of Poisson's formula. *Bousinesq, J. C. R. 94* (1882) 1465-.
- Pressures of air during propagation. *Clausius, R. C. R. 55* (1862) 367-.
- Production and propagation. *Williams, C. J. B. Ph. Mg. 6* (1835) 25-.
- —. *Mackenzie, (Sir) G. S. Edinb. N. Ph. J. 42* (1847) 197-.
- of sound of great intensity. *Tait, P. G. Edinb. R. S. P. 9* (1878) 737-.
- Projectiles, rapid. *Durand-Gréville, E. Rv. Sc. 41* (1888) 494-.
- , phenomenon. *Réveille, (le lt.) V. Rv. Mar. et Col. 123* (1894) 241-; 126 (1895) 243-.
- Propagation in long pipes. *Biot, J. B. Par. S. Phlm. Bll. 1* (1808) 269-.
- pipes. *Neyreneuf, V. C. R. 95* (1882) 218-.
- —. *Violle, —, & Vautier, —. C. R. 102* (1886) 103-; 110 (1890) 230-; A. C. 19 (1890) 306-.
- —. *Neyreneuf, V. C. R. 111* (1890) 28-; A. C. 22 (1891) 368-.
- —. *Violle, J., & Vautier, T. C. R. 120* (1895) 1402-; 121 (1895) 51-.
- — to great distance. *Schale, —. Z. Berg- H.-Salw. 45* (1897) (Ab.) 271-.

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- The Earth. *Jannettaz, É. Par. S. Gl. Bll. 1* (1873) 117-.
- —. *Forel, F. A. Nt. 31* (1885) 483-.
- Elastic media. *Blake, E. W. Silliman J. 5* (1848) 373-.
- Gases. *Chladni, E. F. F. J. de Ps. 69* (1809) 138-.
- *Kerby, F., & Merrick, A. Nicholson J. 27* (1810) 269-; 33 (1812) 161-.
- *Terquem, A. [1873] A. Ps. C. 151* (1874) 620-.
- *Dvořák, V. Wien Ak. Sb. 69* (1874) (Ab. 2) 151-.
- *Neyreneuf, V. C. R. 96* (1883) 1312-; A. C. 2 (1894) 251-.
- , integral of fundamental equation for propagation in. *Poisson, S. D. [1807-19] Par. Éc. Pol. J. 14^e cah. (1808) 319-; Par. Mm. Ac. Sc. 3* (1818) 121-.
- — — — — (Poisson). *Liouville, J. C. R. 42* (1856) 465-.
- , mixed. *Brillouin, M. A. C. 18* (1899) 433-.
- , propagation of condensation impulses in. *Curry, C. E. A. Ps. C. 51* (1894) 460-.
- Heterogeneous medium. *Bertrand, J. C. R. 22* (1846) 1136-.
- of lamellar structure. *Kasterin, N. Arch. Néerl. 5* (1900) 506-.
- Homogeneous unlimited medium in equilibrium. *Dieu, T. Liouv. J. Mth. 14* (1849) 345-.

- Liquids. *Ellis, F. Nicholson J. 25* (1810) 188-.
- Moving air. *Jäger, G. Wien Ak. Sb. 105* (1896) (Ab. 2a) 1040-.
- Solids. *Chladni, E. F. F. Voigt Mg. 1* (1797) 7-.
- *La Place, P. S. (marquis) de. Par. S. Phlm. Bll. (1816) 190-.*
- *Gezechus [Heschus], N. A. Rs. Ps.-C. S. J. 26* (Ps.) (1894) 322-; J. de Ps. 4 (1895) 586-.
- and liquids. *Arnim, L. A. von. Gilbert A. 4* (1800) 112-.
- Water. *Nollet, —. Gilbert A. 44* (1813) 346-.
- *Muncke, G. W. Gilbert A. 48* (1814) 66-.
- *Colladon, D. C. R. 13* (1841) 439-.
- , sound shadows in. *Le Conte, (Prof.) J. [1881] Am. J. Sc. 23* (1882) 27-.
- Wires, etc., transmission of musical sounds by. *Wheatstone, (Sir) C. R. I. J. 2* (1831) 223-.
- , transmission by; and simple microphone receivers. *Millar, W. J. [1879] Glasg. Ph. S. P. 12* (1880) 20-.
- , of speech by. *Weinhold, A. Carl Rpm. 6* (1870) 168-.
- — — — —, etc. by. *Millar, W. J. L. Ps. S. P. 2* (1879) 292-; Ph. Mg. 6 (1878) 115-.
- Wood. *Walker, E. Nicholson J. 4* (1803) 69-.

- Reciprocity, principle of, applied to acoustics. *Rayleigh, (Lord). [1876] R. S. P. 25* (1877) 118-.
- Rectilinear diffusion of sound. *Kalischer, S. Berl. Ps. Gs. Vh. (1890) 111-.*
- transmission of sound and light. *Challis, J. Ph. Mg. 11* (1881) 249-.
- Signals, anomalies. *Welling, J. C. [1881] Wash. Ph. S. Bll. 5* (1883) 39-.
- and audibility. *Allard, É. A. Pon. Chauss. 5* (1883) 567-.
- , cannon-. *Delauney, —. Rv. Mar. et Col. 81* (1884) 229-.
- , Lacoine's system. *Guarienti, A. [1899] Rv. Mar. et Col. 146* (1900) 604-.
- , marine danger-. *Brodie, J. [1866] Edinb. Sc. S. Arts P. 7* (1868) 102-.
- , use of siren and resonators as. *Genglaire, —. Rv. Mar. et Col. 94* (1887) 346-.
- , submarine. *Brillouin, —. C. R. 104* (1887) 1821-.
- , —. *Hardy, E. C. R. 126* (1898) 1496-.
- — (acoustic triangulation). *Baxter, S. Nt. 62* (1900) 422-.
- Siren fog-horn, electric, Trudeau's. *Keeley, D. H. Sc. Abs. 2* (1899) 638.
- Soundless zones, Duane's. *Tyndall, J. [1882] R. S. P. 34* (1883) 18-.
- Speaking trumpets. *Hassenfratz, J. H. [1804] Par. Mm. Sav. Étr. 2* (1811) 101-.
- and bells of wind instruments. *Neyreneuf, —. Caen Ac. Mm. (1891) (Pt. 1) 3-.*
- — ear trumpets, theory. *Daguin, P. A. Toul. Mm. Ac. 2* (1864) 410-.
- , mathematical theory. *Gough, J. Nicholson J. 10* (1805) 160-.

- (Alteration of tone and colour by motion.)
Mach, E. Wien SB. 41 (1860) 543-.
Beetz, W. A. Ps. C. 130 (1867) 587-.
Volpicelli, P. Rm. At. N. Linc. 23 (1869) 232-.
Mayer, A. M. Am. J. Sc. 3 (1872) 267-; 4 (1872) 264-; C. R. 74 (1872) 747-.
Radau, R. Carl Rpm. 8 (1872) 46-.
(Radau.) Mayer, A. M. Am. J. Sc. 4 (1872) 198-.
Schüdingel, —. A. Ps. C. 150 (1873) 356-.
[Eötvös non] Eötvös, (Baron) R. A. Ps. C. 152 (1874) 513-.
Hoorweg, J. L. Arch. Néerl. 9 (1874) 1-.
(Eötvös.) Ketteler, E. A. Ps. C. 154 (1875) 260-.
(Ketteler.) Eötvös, (báros) L. (xii) Mag. Tud. Ak. Ets. 9 (No. 9) (1875) 157-.
(Railway-whistles, variation of pitch on trains meeting.) Pole, W. Nt. 11 (1875) 232-.
Vogel, H. C. A. Ps. C. 153 (1876) 287-.
Bichat, E. Nancy S. Sc. Bll. 4 (11^e Ann.) (1878) 5-.
Dufour, C. Arch. Sc. Ps. Nt. 24 (1890) 242-.
Wyatt, G. H. Nt. 42 (1890) 7-.
Perman, E. P. Nt. 42 (1890) 54.
Everett, J. D. Nt. 42 (1890) 81.
Stewart, R. W. [1890] Nt. 43 (1891) 80.
(Displacement of sonorous bodies.) Galopin, C. Arch. Sc. Ps. Nt. 30 (1893) 320-.
Walter, A. Mh. Mth. Ps. 5 (1894) 151-.
Michelson, V. A. Rs. Ps.-C. S. J. 31 (Ps.) (1899) 119-; Fsehr. Ps. (1899) (Ab. 1) 662.
Echo and moving sound-source, difference of pitch. Richarz, F. N.-Vorp. Mt. 31 (1900) 205-.

- Earth waves. *Abbot, H. L.* Am. J. Sc. 15 (1878) 178-.
 Equilibrium, general law, and motion of solid and liquid bodies. *Wertheim, G.* Wien SB. 5 (1850) (Ab. 2) 19-.

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- (Solids.) *Biot, J. B.* [1808] Arcueil Mm. Ps. 2 (1809) 405-.
Benzenberg, J. F. Gilbert A. 35 (1810) 383-; 37 (1811) 221-.
Gilbert, L. W. (vi Adds.) Gilbert A. 44 (1813) 177-.
(French Academy.) Benzenberg, J. F. Gilbert A. 46 (1814) 325-.
Bauza, F., & Espinosa, J. A. C. 7 (1817) 93-.
Arago, D. F. J. A. C. 20 (1822) 210-.
Goldingham, J. Phil. Trans. (1823) 96-.
Gregory, O. [1823] Camb. Ph. S. T. 2 (1827) 119-.
Beek, A. van, & Moll, G. Phil. Trans. (1824) 424-.
Moll, G. Thomson A. Ph. 10 (1825) 268-; Hall Bij. 1 (1826) 191-.
Stampfer, S. Wien Jb. Pol. I. 7 (1825) 23-.
Foster, H., & Parry, W. E. Ph. Mg. 1 (1827) 12-.
(Observations of Bauza and Espinosa.) Oltmanns, J. Crelle J. 2 (1827) 307-.
(Foster and Parry.) Moll, G. Phil. Trans. (1828) 97-.

- (Van Beek and Moll.) *Simons, G.* Phil. Trans. (1830) 209-; Amst. N. Vh. 3 (1831) 95-.
Bravais, A., & Martins, —. C. R. 19 (1844) 1164-; A. C. 13 (1845) 5-.
Stone, E. J. [1871] Phil. Trans. 162 (1872) 1-.
Blakley, D. J. L. Ps. S. P. 5 (1884) 319-; Ph. Mg. 16 (1883) 447-; L. Ps. S. P. 6 (1885) 228-; Ph. Mg. 18 (1884) 328-.
lecture. Rücker, A. W. L. Ps. S. P. 9 (1888) 259-.
— Aignan, —, & Chabot, —. J. de Ps. 4 (1895) 321-.
- Explosion waves. *Mach, E.* Wien Az. 13 (1876) 193-.
— Mach, E., & Sommer, J. Wien Ak. Sb. 75 (1877) (Ab. 2) 101-.
— Fonseca Benevides, F. da. Lisb. J. Sc. Mth. 7 (1880) 166-.
— Berthelot, M. C. R. 93 (1881) 18-; 94 (1882) 149-; 96 (1883) 672-.
— effect of co-volumes of gases on. Vieille, —. C. R. 112 (1891) 43-.
— in solids and liquids. Berthelot, M. C. R. 100 (1885) 314-; A. C. 6 (1885) 556-; 23 (1891) 485-; Par. S. C. Bll. 5 (1891) 558-.
Formula. Moutier, J. C. R. 71 (1870) 846-.
Guns. Strantz, F. von. Bresl. Schl. Gs. Übs. (1839) 54-.
— Journée, —. C. R. 106 (1888) 244-.
— Labouret, — de. C. R. 106 (1888) 934-; 107 (1888) 85-.
Heat, mechanical theory applied to velocity of sound. Dupré, A. C. R. 64 (1867) 350-.
— radiation, effect on velocity of sound. Stokes, G. G. Ph. Mg. 1 (1851) 305-.
Intensity, effect on velocity. T., M. F. QJ. Sc. (1828) (Pt. 1) 216-.
— — — Kayser, H. A. Ps. C. 6 (1879) 465-.
Longitudinal and transverse waves, velocity calculated by rate of transfer of energy. Poynting, J. H. [1883] Birn. Ph. S. P. 4 (1885) 55-.
Loud sounds. Jacques, W. W. Am. J. Sc. 17 (1879) 116-.
Media at rest. Vieille, P. C. R. 126 (1898) 31-.
— — — propagation of discontinuities in. Vieille, P. C. R. 127 (1898) 41-.
Modulus of elasticity of air, and velocity of sound. Tredgold, T. Tilloch Ph. Mg. 52 (1818) 214-.
— — — rod from musical note. Bell, A. Camb. and Dubl. Mth. J. 3 (1848) 63-.
Molecular velocity of gases and velocity of sound. Roiti, A. [1876] Rm. R. Ac. Linc. Mm. 1 (1877) 39-.
— — — — — (Roiti). Brusotti, F. Mil. I. Lomb. Rd. 10 (1877) 209-.
— — — — — (Brusotti). Roiti, A. Rm. R. Ac. Linc. T. 1 (1877) 171-.
Percussion. Mach, E. Wien Ak. Sb. 97 (1889) (Ab. 2a) 1045-; 98 (1890) (Ab. 2a) 1257-.
— Oekinghaus, E. Wien Ak. Sb. 105 (1896) (Ab. 2a) 437-.

- Plane air waves of finite velocity. *Riemann, B.* Gött. Ab. 8 (*Mth.*) (1858-59) 43-.
- and spherical waves of finite amplitude. *Burton, C. V.* L. Ps. S. P. 12 (1894) 161-; Ph. Mg. 35 (1893) 317-.
- Rankine's investigation. *Everett, J. D.* [1888] Nt. 39 (1889) 31.
- (Everett). *Lodge, O. J.* [1888] Nt. 39 (1889) 79-.
- Simple deduction. *Weyrauch, J. J.* A. Ps. C. 23 (1884) 147-.
- Sound and other vibrations. *Tillmann, S. D.* Les Mondes 8 (1865) 256-.
- Temperature effects, and Bianconi's experiments (1740). *Govi, G.* Rm. R. Ac. Line. T. 7 (1883) 91-.
- and pressure, variation effects. *Herapath, J.* Gleanings Sc. 2 (1830) 307-.
- table (-10° to $+30^{\circ}$ R). *Benzenberg, J. F.* Gilbert A. 39 (1811) 136-.
- , variation effects. *Ivory, J.* Ph. Mg. 1 (1827) 249-.
- Temperatures, high, velocity at. *Benzenberg, J. F.* Gilbert A. 42 (1812) 1-, 12-, 30-.

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- (Is heat set free in sound?) *Wrede, E. F.* Gilbert A. 18 (1804) 401-.
- (Theory and experiment compared.) *Precht, J. J.* Gilbert A. 21 (1805) 449-.
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- Araldi, M.* Bologna Mm. I. It. 2 (1808) 311-, 431-.
- (Correction.) *La Place, P. S. (marquis) de.* A. C. 3 (1816) 238-.
- (Theory and experiment compared.) *Fischer, E. G.* Berl. Ab. (1816-17) (Ps.) 63-.
- (La Place's theorem.) *Tralles, J. G.* Gilbert A. 65 (1820) 43-.
- (Application of theory of elastic fluids.) *La Place, P. S. (marquis) de.* Par. S. Phlm. Bll. (1821) 161-.
- La Place, P. S. (marquis) de.* A. C. 20 (1822) 266-.
- (Specific heat of elastic fluids.) *Dulong, P. L.* [1828] Par. Mm. Ac. Sc. 10 (1831) 147-.
- (— — — — —) (Dulong.) *Simons, G.* Phil. Trans. (1830) 209-; Amst. N. Vh. 3 (1831) 95-.
- (Theory and experiment compared.) *Ritchie, W.* R. S. P. 3 (1837) 458.
- Joule, J. P.* Ph. Mg. 31 (1847) 114-.
- Challis, J.* Ph. Mg. 32 (1848) 276-.
- (Challis.) *Airy, G. B.* Ph. Mg. 32 (1848) 339-.
- (Airy.) *Challis, J.* Ph. Mg. 32 (1848) 494-.
- (Challis.) *Moon, R.* [1848] (viii) Camb. Ph. S. P. 1 (1866) 75.
- Stokes, G. G.* Ph. Mg. 33 (1848) 349-.
- Challis, J.* Ph. Mg. 34 (1849) 88-.
- (Challis.) *Stokes, G. G.* Ph. Mg. 34 (1849) 203-.
- (Stokes.) *Challis, J.* Ph. Mg. 34 (1849) 284-.
- (Challis.) *Stokes, G. G.* Ph. Mg. 34 (1849) 348-.

- Airy, G. B.* Ph. Mg. 34 (1849) 401-.
- (Stokes.) *Challis, J.* Ph. Mg. 34 (1849) 449-.
- (Challis.) *Stokes, G. G.* Ph. Mg. 34 (1849) 501-.
- (Solution of problem founded on atomic constitution of fluids.) *Potter, R.* Ph. Mg. 1 (1851) 101-.
- (La Place's theory.) *Rankine, W. J. M.* Ph. Mg. 1 (1851) 225-.
- (— — —) (Rankine.) *Potter, R.* Ph. Mg. 1 (*1851) 317-.
- (Potter.) *Haughton, S.* Ph. Mg. 1 (1851) 332-.
- Challis, J.* Ph. Mg. 1 (1851) 405-.
- (Poisson's investigation, Potter's criticism.) *Rankine, W. J. M.* Ph. Mg. 1 (1851) 410-.
- (La Place's theory.) *Waterston, J. J.* Ph. Mg. 16 (1858) 481-.
- (Mathematical theory.) *Earnshaw, S.* [1858-59] B. A. Rp. (1858) (pt. 2) 34-; Phil. Trans. (1860) 133-.
- Earnshaw, S.* Ph. Mg. 19 (1860) 449-; 20 (1860) 186-.
- (La Place's correction.) *Le Conte, (Prof.) J.* [1861] (viii) Ph. Mg. 27 (1864) 1-.
- (— — —) *Tyndall, J.* (viii) Ph. Mg. 26 (1863) 384-; 27 (1864) 41.
- Challis, J.* Ph. Mg. 27 (1864) 92-.
- (La Place's correction.) (Le Conte.) *Earnshaw, S.* Ph. Mg. 27 (1864) 98-.
- (— — —) (— — —) *Potter, R.* Ph. Mg. 27 (1864) 104-.
- Bosanquet, R. H. M.* Ph. Mg. 3 (1877) 271-, 343-, 418-; 4 (1877) 25-, 125-, 216-.

- Thunder. *Earnshaw, S.* B. A. Rp. (1860) (pt. 2) 58.
- *Montigny, C.* Brux. Ac. Bll. 9 (1860) 36-.
- , intensity and velocity. *Laurent, Albert.* Moigno Cosmos 17 (1860) 7-.

VELOCITY OF SOUND IN AIR
IN TUBES.

- Kundt, A.* Berl. Mb. (1867) 858-; A. Ps. C. 135 (1868) 337-, 527-.
- Schneebeli, H.* A. Ps. C. 136 (1869) 296-.
- Seebeck, A.* A. Ps. C. 139 (1870) 104-.
- Bourget, J.* C. R. 73 (1871) 1203-.
- Tumlärz, O.* [1879] Wien Ak. Sb. 80 (1880) (Ab. 2) 439-.
- Baille, J. B.* As. Fr. C. R. (1885) (Pt. 1) 104-; J. de Ps. 6 (1887) 493-.
- Cylindrical tubes. *Leroux, F. P.* C. R. 55 (1862) 662-; 64 (1867) 392-; A. C. 12 (1867) 345-.
- *Violle, —.* As. Fr. C. R. (1890) (Pt. 1) 169-.
- — — bend, acoustic value. *Leroux, F. P.* A. C. 12 (1867) 409-.
- Elastic tubes. *Korteweg, D. J.* A. Ps. C. 5 (1878) 525-.

9210 Velocities of Sound

Elastic tubes. *Lamb, H. Manch. Lt. Ph. S. Mm. & P.* 42 (1898) No. 9, 16 pp.
Narrow tubes. *Blaikley, D. J. Ph. Mg.* 7 (1879) 339-.

VELOCITY OF SOUND IN VARIOUS MEDIA.

Air, compressed. *Witkowski, A. W.* [1899] *Krk. Ak. (Mt.-Prz.) Rz.* 19 [20] (1902) 1-; *Cro. Ac. Sc. Bil.* (1899) 138-.
—, gases and vapours, for pure notes of different pitch. *Low, J. W. Ph. Mg.* 38 (1894) 249-.
—, rarefied, in tubes. *Stolétov, A. G. Rs. Ps.-C. S. J.* 18 (Ps.) (1886) 65-; *J. de Ps.* 6 (1887) 203.
Alloys. *Gerosa, G. G. Rm. R. Ac. Linc. Rd.* 4 (1888) (Sem. 1) 127-.
Bar, prismatic, elastic. *Saint Venant, Barré de. C. R.* 64 (1867) 1192-.
Chlorine. *Martini, T. Ven. I. At.* 7 (1880-81) 491-, 639-.
Ebonite. *Campanile, F. Nap. Rd.* 33 (1894) 63-.
Gases. *Stefan, J. Pogg. A.* 118 (1863) 494-.
— *Regnault, V. C. R.* 66 (1868) 209-; *Par. Ac. Sc. Mm.* 37 (1868) 3-.
— (Regnault). *Breton, P. Les Mondes* 16 (1868) 351-.
— (—). *Radau, R. Carl Rpm.* 4 (1868) 133-.
— (—). *Rink, H. J.* [1872] *Arch. Néerl.* 8 (1873) 25-.
— *Martini, T. Ph. Mg.* 39 (1895) 142-.
—, differences of velocity in, illustration. *Gibbes, L. R. Am. As. P.* (1850) 115-.
—, hot, velocity of waves of compression in. *Le Chatelier, H.-C. R.* 131 (1900) 30-.
— and metals. *Pazienti, A. Ven. Mm. I.* 12 (1864) 447-.
—, mixed. *Dvořák, V. (ix) Wien Az.* 10 (1873) 186-.
— and solids, difference of velocity in, experiment. *Griveaux, F. J. de Ps.* 2 (1883) 228-.
— — and liquids. *Masson, A. C. R.* 44 (1857) 464-; *A. C.* 53 (1858) 257-.
—, velocity of sound and molecular motion in. *Mulder, E. A. Ps. C.* 140 (1870) 288-.
—, — — in, and their molecular weight, relations. *Bender, Carl. D. C. Gs. B.* 6 (1873) 665-.
Hydrogen gas. *Leslie, John.* [1821] *Camb. Ph. S. T.* 1 (1822) 267-.
Iron. *Breguet, L., & Wertheim, —. C. R.* 32 (1851) 293-.
Liquid and solid bodies of limited dimensions. *Rankine, W. J. M. Camb. and Dubl. Mth. J.* 6 (1851) 238-.
Liquids. *Wertheim, G. C. R.* 27 (1848) 150-; *A. C.* 23 (1848) 434-.
— *Potter, R. Ph. Mg.* 1 (1851) 319-.
— *Martini, T. Ven. I. At.* (1885-86) *App.* 87 pp.
Metals, specific heat and sound velocity. *Poulsen, V. N. Ts. Fs. K.* 2 (1897) 374-; *C. Ztg.* 21 (1897) (Rpm.) 305.
Rods. *Wertheim, G. A. C.* 31 (1851) 36-.

Reflection of Sound 9220

Solids (lecture experiments). *Gezechus [Hesehus], N. Rs. Ps.-C. S. J.* 17 (Ps.) (1885) 326-; *Exner Rpm.* 23 (1887) 242-.
Vapours. *Neyreneuf, V. A. C.* 9 (1886) 535-.
— *Gerosa, G. G., & Mai, E. Rm. R. Ac. Linc. Rd.* 4 (1888) (Sem. 1) 728-, 800-.
Water. *Langlois, M. C. R.* 102 (1886) 1451-.
— in pipes. *André, F. C. R.* 70 (1870) 568-.
— — *Dvořák, V. Wien Ak. Sb.* 70 (1874) (Ab. 2) 522-.
—, sea, velocity of vibrations of large amplitude in. *Threlfall, R., & Adair, J. F. R. S. P.* 46 (1890) 496-.
Wires, stretched, velocity of mechanical impulse in. *Meyer, S. Wien Ak. Sb.* 105 (1896) (Ab. 2a) 1015-.
Wood. *Kayser, H. Am. J. Sc.* 23 (1882) 415-.

9220 Reflection and Refraction of Sound. (See also 9040.)

(Motion of 2 elastic superposed fluids.) *Poisson, S. D.* [1823] *Par. Mm. Ac. Sc.* 10 (1831) 317-.
Green, G. [1837] *Camb. Ph. S. T.* 6 (1838) 403-.
Fischer, A., & Mach, E. Wien Sb. 67 (1873) (Ab. 2) 81-.
(Reflection and refraction by heated gas.) *Cottrell, J. R. S. P.* 22 (1874) 190-.

REFLECTION.

Vionnois, —. C. R. 60 (1865) 458.
Sharpe, H. J. Mess. Mth. 2 (1873) 159-.
Rayleigh, (Lord). Ph. Mg. 3 (1877) 458-.
and absorption by porous and pervious materials. *Tufts, F. L.* [1899] *N. Y. Ac. A.* 12 (1899-1900) 621.
— diffraction. *Seebeck, A. Pogg. A.* 59 (1843) 177-.
echo in church, *Girgenti. Actis, (Vabbé) —. Turin Mm. Ac.* 4 (1788-89) 43-.
—, depth of sea determined by. *Bonnycastle, C. Franklin I. J.* 24 (1839) 351-.
— and moving sound source, difference of pitch. *Richarz, F. N.-Vorp. Mt.* 31 (1900) 205-.
— at Muiderberg. *Buys, J. [d Dijk, P. W. L. van]. Haarl. Vh.* 6 (1812) 123-.
— — *Marum, M. van. Haarl. Vh.* 6 (1812) 154-.
— and thunder roll. *Reis, Paul. (xii) Humb.* 2 (1883) 215-.
echoes, mountain, and Kent bugle. *Scoresby, (Rev.) W. Edinb. N. Ph. J.* 6 (1829) 371-.
by flames and heated gases. *Mayer, A. M. Am. J. Sc.* 8 (1874) 362-.
harmonic overtones produced by. *Oppel, J. J. (xii) Frkf. a. M. Ps. Vr. Jbr.* (1863-64) 70-.
method of studying. *Rood, O. N. Am. J. Sc.* 19 (1880) 133-.

9220 Reflection and Refraction of Sound Interference of Sound 9230

- of motion of elastic fluids in pipes, and theory of wind instruments. *Poisson, S. D.* [1818-19] *Par. Ac. Sc. Mm.* 2 (1819) 305-.
- multiple. *Fabri, R.* *Rm. At.* 13 (1859-60) 293-.
- , tone due to. *Baumgarten, A.* [1876] *Innsb. Nt. Md. B.* 7 (1877) (*Heft* 1) 116-.
- phenomenon. *Oppel, J. J.* *Frkf. Jbr. Ps. Vr.* (1858-59) 39-.
- , *French, A.* *Nt.* 12 (1875) 46-.
- , *Högyes, E.* *Termt. Közl.* 18 (1886) 179-.
- in church at Box. *Dufour, C.* *Laus. S. Vd. Bll.* 15 (1878) 333-.
- pitch alteration in. *Oppel, J. J.* (*vi Add.*) *Frkf. Jbr. Ps. Vr.* (1853-54) 40-.
- by a plane. *Abt, A.* *Exner Rpm.* 21 (1885) 503-.
- polarisation by. *Wheatstone, (Sir) C.* *Thomson A. Ph.* 6 (1823) 87-.
- , *Kämtz, L. F.* *Schweigger J.* 42 (= *Jb.* 12) (1824) 197-.
- , *Weber, W. E.* *Schweigger J.* 46 (= *Jb.* 16) (1826) 108-.
- , *Robinson, S. W.* *Franklin I. J.* 81 (1881) 201-.
- , analogous to optical polarisation. *Macé de Lépinay, J.* *Par. S. Ps. Sé.* (1888) 327-.
- reflection tones. *Oppel, J. J.* *Pogg. A.* 101 (1857) 105-; 147 (1872) 369-.
- , *Reuleaux, H.* *Bonn NH. Vr. Vh.* 41 (1884) 278-.
- , and tuning fork test. *Oppel, J. J.* (*xii*) *Frkf. a. M. Ps. Vr. Jbr.* (1862-63) 14-.
- , use in estimating dimensions. *Oppel, J. J.* (*xii*) *Frkf. a. M. Ps. Vr. Jbr.* (1860-61) 53-.
- reverberant mountains, Thuringia. *Jacobs, —.* *Zach M. Cor.* 27 (1813) 418-.
- sound shadow. *Lungo, C. del.* *Rv. Sc. Ind.* 29 (1897) 268.
- , visibility. *Boys, C. V.* *Nt.* 56 (1897) 173-.
- velocity by Fizeau's method for light. *Nardroff, E. R. von.* [1900] *N. Y. Ac. A.* 13 (1900-01) 494-.
- sounding-board in Attercliffe Church. *Blackburn, J.* *Phil. Trans.* (1828) 361-.
- in tubes. *Halsch, F.* [1886] *Wien Ak. Sb.* 94 (1887) (*Ab.* 2) 763-.
- velocity of sound produced by percussion. *Mach, E.* *Wien Ak. Sb.* 97 (1889) (*Ab.* 2a) 1045-; 98 (1890) (*Ab.* 2a) 1257-.

REFRACTION.

- Sondhauss, C.* *Bresl. Schl. Gs. Übs.* (1851) 27-; *Pogg. A.* 85 (1852) 378-.
- Hajech, C.* *Mil. G. I. Lomb.* 8 (1856) 406-; *Mil. At. I. Lomb.* 1 (1858) 448-.
- Taylor, W. B.* *Smiths. Rp.* (1875) 205-.
- Boehm, E. E., & Schellbach, K. H.* *A. Ps. C.* 8 (1879) 645-.
- Reis, Paul.* (*xii*) *Humb.* 2 (1883) 138-.
- Neyreneuf, —.* *As. Fr. C. R.* (1894) (*Pt.* 2) 352-.
- by air-strata of unequal temperature. *Fizeau, H.* *C. R.* 104 (1887) 1347-.

- atmospheric. *Reynolds, O.* *R. S. P.* 22 (1874) 295-, 531-.
- , *Schuster, A.* [1875] *Nt.* 13 (1876) 67.
- , *Reynolds, O.* [1876] *Phil. Trans.* 166 (1877) 315-.
- , *Kneser, A.* *A. Ps. C.* 11 (1880) 518-.
- , and total reflection, theory; and importance for navigation. *Matthiessen, L.* *Ac. Nt. C. N. Acta* 74 (1899) 457-.
- audibility of sounds, and wind-refraction. *Reis, Paul.* (*xii*) *Humb.* 2 (1883) 53-.
- deflection. *Fuchs, —.* *Humb.* 9 (1890) 63-.
- dispersion in heterogeneous medium. *Kasterin, N.* *Rs. Ps.-C. S. J.* 30 (*Ps.*) (1898) 61-; *Amst. Ak. Vs.* 6 (1898) 460-, 532.
- experiments. *Perrot, F. L., & Dussaud, F.* *Arch. Sc. Ps. Nt.* 34 (1895) 57-.
- formula for. *Young, (Dr.) T.* *Bb. Brit.* 18 (1801) 354-.
- method of showing and measuring. *Doppler, C.* *Wien Sb.* (1849) 322-.
- optics of mirage similar to. *Everett, J. D.* *Ph. Mg.* 45 (1873) 161-, 248-.
- rainbow, acoustic. *Strehlke, F.* *Pogg. A.* 18 (1830) 475-.
- by sensitive flames. *Gezechus [Hesehus], N. A.* *Rs. Ps.-C. S. J.* 17 (*Ps.*) (1885) 332.
- and velocity of sound in sound-transparent bodies. *Gezechus [Hesehus], N.* *Rs. Ps.-C. S. J.* 22 (*Ps.*) (1890) 233-; *Exner Rpm.* 27 (1891) 471-.
- by wind. *Delaroché, F.* [1813] *A. C. I.* (1816) 176-.
- , *Haldat du Lys, C. N. A. de.* *J. de Ps.* 79 (1814) 285-.
- , *Rees, R. van.* *Quetelet Cor. Mth.* 2 (1826) 22-.
- , *Stokes, G. G.* *B. A. Rp.* (1857) (*pt.* 2) 22-.
- , *Vargiu, G. I.* *Les Mondes* 9 (1866) 95-.
- , *Barton, E. H.* [1900] *L. Ps. S. P.* 17 (1901) 534-.

9230 Interference and Diffraction of Sound. Beats.

INTERFERENCE.

- Addams, R.* *B. A. Rp.* (1834) (*pt.* 2) 557.
- Kane, (Sir) R. J.* *B. A. Rp.* (1835) (*pt.* 2) 13-.
- Dove, H. W.* *Pogg. A.* 44 (1836) 272; *Berl. Mb.* (1857) 291-.
- Fabri, R.* *Rm. At.* 12 (1858-59) 297-.
- Deneke, F.* [1864] *Danzig Schr.* 1 (*Heft* 2) (1865) 4 pp.
- Kahl, E.* *Z. Mth. Ps.* 11 (1866) 170-.
- Mees, R. A.* (*xii*) *Mbl. Nt.* 4 (1874) 77-.
- Mach, E., & Mach, L.* *Wien Ak. Sb.* 98 (1890) (*Ab.* 2a) 1338-.
- apparatus. *Lissajous, J.* *C. R.* 40 (1855) 133-.
- , *Quincke, G.* *A. Ps. C.* 128 (1866) 177-.
- , *Stefan, J.* *Wien Sb.* 56 (1867) (*Ab.* 2) 561-.

- apparatus. *Barrett, W. F. L. Ps. S. P. 1* (1876) 51-; *Ph. Mg. 48* (1874) 139-.
- *Righi, A. Bologna Ac. Sc. Mm. 2* (1891) 261-.
- *Slotte, K. F. Helsingf. Öfv. 38* (1896) 86-.
- application of law to combination-tones. *Poggendorf, J. C. Pogg. A. 32* (1884) 520-.
- and consonance and absorption in sound and light, pendulum experiments. *Isenkrahe, C. Carl Rpm. 16* (1880) 99-, 516-.
- disturbance by an element of plane wave of sound or light. *Basset, A. B. L. Mth. S. P. 22* (1891) 317-.
- of electric explosions. *Waha, M. de. Lux. I. Ph. 16* (1877) 49-.
- experiment, lecture-. *Terquem, A. J. de Ps. 6* (1877) 316-.
- experiments. *Villari, E. Bologna Ac. Sc. Mm. 1* (1890) 673-.
- with sensitive flames. *Gezechus [Hesekus], N. Rs. Ps. C. S. J. 24 (Ps.)* (1892) 156-; *J. de Ps. 2* (1893) 528.
- vowels. *Sauberscharz, E. Pflüg. Arch. Pl. 61* (1895) 1-.
- of longitudinal waves, construction for. *Matthes, C. J. Arch. Mth. Ps. 49* (1869) 486-.
- observed with membrane. *Weber, W. E. Schweigger J. 50 (= Jb. 20)* (1827) 247-.
- phenomena due to concurrence of 2 sounds. *Radau, R. Mon. Sc. 18* (1876) 323-.
- secondary tones made audible by. *Dove, H. W. Berl. Mb. (1862) 97-.*
- by telephone. *Cook, C. S. Science 1* (*1883) 167.
- tubes, Nörremberg's. *Müller, (Dr.) J. [1854] Freiburg B. 1* (1858) 43-.
- of tuning fork (intensity in different directions). *Chladni, E. F. F. Kastner Arch. Ntl. 7* (1826) 92-.
- — — — —. *Chladni, E. F. F., & Sömmerring, W. Kastner Arch. Ntl. 8* (1826) 91-.
- — — — —. *Addams, R. (vi Adds.) W. Eng. J. 1* (1836) 60-.
- — — — —. *Kieseling, H. A. Ps. C. 130* (1867) 177-.
- 2 tuning forks. *Grüel, C. A. Pogg. A. 104* (1858) 494-.
- near wall from which sound is reflected. *Rayleigh, (Lord). Ph. Mg. 7* (1879) 150-.
- "wandering tones." *Reuleaux, H. Bonn NH. Vr. Vh. 37* (1880) 161-; *Bonn Niedr. Gs. Sb. (1881) 116-.*
- wave-length of sound by grating method. *Nardroff, E. R. von. [1900] N. Y. Ac. A. 13* (1900-01) 511-.

BEATS.

- Ohm, G. S. Pogg. A. 47* (1839) 463-.
- Fabri, R. Rm. At. N. Linc. 17* (1864) 235-.
- beat tone apparatus for lectures. *König, R. A. Ps. C. 12* (1881) 350-.
- and beat tones of one body. *König, R. A. Ps. C. 39* (1890) 395-.
- beat tones, cerebral origin. *Schaefer, K. L. Z. Psychol. 4* (1893) 348-; *5* (1893) 397-.
- — — — —. *Scripture, E. W. Ph. Stud. 8* (1893) 638-.
- and beat tones due to harmonic intervals. *König, R. A. Ps. C. 12* (1881) 335-.
- beat tones of very high frequency, and dust figures produced by them. *König, R. A. Ps. C. 69* (1899) 626-, 721-.
- — — — — from 2 vibrating bodies which are separately inaudible because of their high frequency. *Mayer, A. M. B. A. Rp. (1894) 573.*
- and combination tones, and Tartini's tones. *Crotti, P. (xii) Rv. Sc.-Ind. 12* (1880) 401-, 470-.
- — — — — theory. *Radau, R. Les Mondes 8* (1865) 9-, 52-.
- of consonances of form $h:1$. *Bosanquet, R. H. M. L. Ps. S. P. 4* (1881) 221-; *Ph. Mg. 11* (1881) 420-, 492-.
- and difference tones, appreciation. *Scripture, E. W. Ph. Stud. 7* (1892) 630-.
- — — — — perception and localisation. *Schaefer, K. L. Z. Psychol. 1* (1890) 81-.
- of Hawkes's douzeave. *B., J. Tilloch Ph. Mg. 37* (1811) 128-.
- imperfect consonances. *De Morgan, A. [1857] Camb. Ph. S. T. 10* (1864) 129-.
- — — — — Thomson, (Sir) W. *Edinb. R. S. P. 9* (1878) 602-.
- — — — — Bosanquet, R. H. M. *Ph. Mg. 12* (1881) 434-; *13* (1882) 131.
- — — — — Thompson, S. P. *Ph. Mg. 13* (1882) 68-.
- — — — — history of theory. *Bosanquet, R. H. M. Ph. Mg. 12* (1881) 270-.
- Koenig's superior. *Sidgreaves, W. [1890] Nt. 43* (1891) 9-.
- method of producing. *Athanasiades, G. A. Ps. 3* (1900) 753.
- musical. *Pole, W. Nt. 13* (1876) 212-, 232-.
- — — — — Ellis, A. J. *R. S. P. 30* (1880) 520-.
- Scheibler's investigations. *Röber, A. Pogg. A. 32* (1834) 333-, 492-.
- Tartini's tones. *Purkyně, J. E. Kastner Arch. Ntl. 7* (1826) 39-.
- — — — — Weber, W. E. *Pogg. A. 15* (1829) 216-.
- — — — — Helmholz, H. *Rheinl. Westphal. Sb. 13* (1856) lxxv-.
- — — — — mathematical theory. *Hopkinson, J. Mess. Mth. 2* (1873) 24-.
- — — — — objective existence. *Dove, H. W. Pogg. A. 107* (1859) 652-.
- theory. *Terquem, A., & Boussinesq, V. J. As. Fr. C. R. (1874) 220-.*
- — — — — Buzzolini, G. (xii) *Rv. Sc.-Ind. 12* (1880) 493-.
- — — — — application to tuning of organs, etc. *Vincent, A. J. H. A. C. 26* (1849) 37-.
- — — — — König's. *Molloy, G. Nt. 42* (1890) 246.
- of 2 tones, each heard by one ear only, central origin. *Ewald, J. R. Pflüg. Arch. Pl. 57* (1894) 80-.
- — — — — tuning forks. *Villari, E. Bologna Ac. Sc. Mm. 2* (1872) 309-.
- — — — — method of tuning to unison. *Spice, R. Am. J. Sc. 11* (1876) 372.
- — — — — microphone observations. *Tuma, J. Wien Ak. Sb. 98* (1890) (Ab. 2a) 1028-.

9240 Damping of Sound-Waves

variation of pitch. *Taylor, S.* Ph. Mg. 44 (1872) 56-.
visual exhibition. *Melde, F.* Pogg. A. 108 (1859) 508-.

DIFFRACTION.

Serrano y Fatigati, E. Arch. Sc. Ps. Nt. 49 (1874) 151-.
Jacques, W. W. Am. Ac. P. 11 (1876) 269-.
Tumlriz, O. A. A. (xii) Lotos 30 (1882) 35-.
Rayleigh, (Lord). [1888] R. I. P. 12 (1889) 187-.
Stevens, W. Le C. Franklin I. J. 127 (1889) 445-; N. Y. Ac. T. 8 (1888-89) 130-.
acoustic shadow of circular disk. *Rayleigh, (Lord).* Ph. Mg. 9 (1880) 281-.
and other phenomena. *Cauchy, A. L.* C. R. 15 (1842) 759-.

9240 Damping of Sound-Waves by Viscosity and Heat-Conduction.

Duff, A. W. Ps. Rv. 11 (1900) 65-.
Audibility and dispersion of sound in air. *Krass, —.* [1897] Westf. Vr. Jbr. (1897-98) 149-.
— of sound, balloon experiments. *Bacon, (Rev.) J. M.* Nt. 60 (1899) 484.
Cooling of air by radiation and conduction; and propagation of sound. *Rayleigh, (Lord).* Ph. Mg. 47 (1899) 308-.
Damping, atmospheric. *Vierordt, K. von.* Z. Bl. 18 (1882) 383-.
—, —, due to internal friction. *Stefan, J.* Wien Sb. 53 (1866) (Ab. 2) 529-.
— with distance. *Schaefer, K. L.* A. Ps. C. 57 (1896) 785-.
— in human body. *Vierordt, K. von.* Z. Bl. 19 (1883) 101-.
— soft bodies. *Warburg, E.* A. Ps. C. 136 (1869) 285-.
— solid bodies, due to internal resistance. *Warburg, E.* Berl. Mb. (1869) 538-; A. Ps. C. 139 (1870) 89-.
— of sound, and air radiation constant. *Duff, A. W.* Ps. Rv. 6 (1893) 129-; Am. As. P. (1899) 125-.
— —, — thermal conductivity. *Brunhes, B. J.* de Ps. 6 (1897) 289-.
— in telephony. *Vierordt, K. von.* A. Ps. C. 19 (1883) 207-.
Decrease of intensity of shrill sounds with time, rate. *Duff, A. W.* B. A. Rp. (1897) 583.
Diminution of velocity of sound in narrow tubes. *Schneebeil, H.* A. Ps. C. 136 (1869) 296-.
— — — — —. *Seebeck, A.* A. Ps. C. 139 (1870) 104-.
Earthquakes, and wave propagation in absorbent media. *Kohl, E.* Mh. Mth. Ps. 9 (1898) 358-.

Acoustic Transparency 9250

Extinction of sound, causes. *Haldat du Lys, C. N. A. de.* Nancy Mm. S. Sc. (1840) 88-; (1848) 362-.
— — — by fog. *Reynolds, O.* [1873] Manch. Lt. Ph. S. P. 13 (1873-74) 43-.
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- , —, of Kundt. *Szathmári*, Á. (xii) *Kolozsvár Orv.-Term. Társ. Ets.* [1] (1876) (*Term. Szak*) [8]-.
- , —, *Schleiermacher*, —. *Karlsruhe Nt. Vr. Vh.* 10 (1888) (*Sb.*) 169-.
- , —, polyphonic echo. *Basso*, G. [1870] *Tor. At. Ac. Sc.* 6 (1870-71) 52-.
- , —, principles of hydrodynamics. *Challis*, J. *Ph. Mg.* 34 (1849) 358-.
- , —, reed pipes. *Aignan*, —, & *Chabot*, —. [1893] *Bordeaux S. Sc. Mm.* 5 (1895) vii-.
- of sounds of different pitch in gases and vapours. *Low*, J. W. A. Ps. C. 52 (1894) 641-.
- in steam. *Neyreneuf*, V. J. de Ps. 4 (1885) 550-.
- by vibrations of compound bars. *Stefan*, J. *Wien Sb.* 57 (1868) (*Ab. 2*) 697-.
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- in wood. *Ihlseng*, M. C. [1877] *Am. J. Sc.* 17 (1879) 125-.

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- Magrini*, L. *Mil. At. I. Lomb.* 2 (1860) 322-.
- Daguin*, P. A. *Toul. Mm.* Ac. 3 (1865) 389-.
- Schulze*, R. *Ph. Stud.* 14 (1898) 471-.
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- Analysers, acoustic. *Valérius*, H. *Brux. Ac. Bll.* 22 (1866) 221-.
- Apparatus, König's. *Müller*, Joh. *Freiburg B.* 5 (1870) (*Heft 1*) 126-.
- Articulate vibrations, photographic records. *Blake*, E. W. *Am. J. Sc.* 16 (1878) 54-.
- Harmonic tones. *Zantedeschi*, F. *Wien SB.* 27 (1857) 284-.
- Instrument, new. *Daguin*, P. A. *Toul. Mm. Ac.* 5 (1867) 302-.
- Musical notes, graphics. *Gellé*, —. Par. S. Bl. Mm. 50 (1898) (*C.R.*) 983-.
- Objective analysis, delicate. *Lummer*, O. *Berl. Ps. Gs. Vh.* (1886) 66-.
- Phonautograph (automatic registration of sounds). *Scott*, E. L. C. R. 53 (1861) 108-.
- , (Scott's). *Lippich*, F. *Wien Sb.* 50 (1865) (*Ab. 2*) 397-.
- , *Morey*, C. A. *Am. J. Sc.* 8 (1874) 130-.

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- Phonautograph, experiments. *Schneebeli, H.* [1878] *Neuch. S. Sc. Bil.* 11 (1879) 302-.
- , —. *Pringsheim, E.* *Berl. Ps. Gs. Vh.* (1889) 43-.
- , new. *Thompson, S. P.* [1880] (xii) *Bristol Nt. S. P.* 3 (1882) 114-.
- , *Osenbrück's, Pensky, B.* *Z. Instk.* 14 (1894) 404-.
- Stroboscopic analysis. *Töpler, A.* *A. Ps. C.* 128 (1866) 108-.
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- Wave siren. *König, R.* *A. Ps. C.* 57 (1896) 339-.

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- Koch, A. J.* *Wien Sb.* 51 (1865) (*Ab.* 2) 389-.
- Mach, E.* *Z. Mth. Ps.* 10 (1865) 425-.
- Mayer, A. M.* *Ph. Mg.* 48 (1874) 266-, 371-, 445-, 513-; *Am. J. Sc.* 8 (1874) 241-; 9 (1875) 267-; 12 (1876) 329-; 47 (1894) 1-, 134.
- Izrailev, A. A.* *Mosc. S. Sc. Bil.* 41 (*No.* 2) (1884) 58-.
- Melde, F.* *Humb.* 5 (1886) 289-, 449-.
- Love, J. K.* *Glasg. Ph. S. P.* 20 (1889) 196-.
- Consonants and musical instruments, analogy between. *Rouse, M. L.* [1886] *Cn. I. P.* 4 (1887) 92-.
- Delezenne's experiments. *Meerens, C.* [1869] (xii) *Lille S. Mm.* 7 (1870) 321-.
- Fundamental law of acoustics, and contributions to theory of acoustic instruments. *Schafhäutl [Pellisov], C. E.* *Schweigger J.* 67 (= *Jb.* 7) (1833) 169-, 227-.
- laws of acoustics, and definition of Schall, Ton and Knall. *Schafhäutl [Pellisov], C. E.* *Schweigger J.* 69 (= *Jb.* 9) (1833) 289-.
- History. *Mercadier, E.* *J. de Ps.* 1 (1872) 109-.
- Metronome, normal period for, as basis of harmony. *Saint-Saens, —.* *C. R.* 102 (1886) 1530-.

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- and colour, analogy. *Oppel, J. J.* (vi *Adds.*) *Frkf. Jbr. Ps. Vr.* (1854-55) 47-.
- , —. *Durand, A.* *Les Mondes* 6 (1864) 562-; 7 (1865) 508-; 8 (1865) 632-.
- , —. *Barrett, W. F.* *Nt.* 1 (1870) 286-.
- , —. *Deas, F.* *Nt.* 1 (1870) 384-.
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- , —. *Taylor, S.* *Nt.* 1 (1870) 430-.
- , —. *Okeley, W. S.* *Nt.* 1 (1870) 557-.
- , —. *Murphy, J. J.* *Nt.* 1 (1870) 651-.
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- fundamental principles. *Delezenne, —.* *Lille Mm. S.* (1848) 39-.
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- , —. *Werneburg, J. F. C.* *Kastner Arch. Ntl.* 3 (1824) 129-.
- , —. *Helmholtz, H.* *Mon. Sc.* 7 (1865) 193-.
- , —, Koenig's researches. *Thompson, S. P.* [1890] *Nt.* 43 (1891) 199-, 224-, 249-; *R. I. P.* 13 (1893) 206-.
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- , mathematical. *Olio, G. dall'.* *Mod. S.* *It. Mm.* 9 (1802) 609-.
- , —. *Safford, T. H.* *Camb. (M.) Mth. M.* 1 (1859) 308-.
- , —. *Prevost, A. P.* *Bb. Un. Arch.* 13 (1862) 281-.
- , philosophical and physical. *Schubring, G.* *Halle Z. Nw.* 30 (1867) 185-.

- Tones and sounds, nature. *Botta, C.* [1801] *Turin Mm. Ac.* (1802-03) 191-.

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- Clavicylinder and euphonium. *Chladni, E. F. F.* *Voigt Mg.* 2 (1800) 150-; *J. de Ps.* 68 (1809) 246-; *Gilbert A.* 69 (1821) 51-.
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- and melotrope (Carpentier). *Dieudonné*, E. Lum. Élect. 26 (1887) 651-.
- Melotrope. *Carpentier*, J. C. R. 104 (1887) 1604-.

- Orchestra, automatic. *Gregorio*, A. de. Palermo Ac. At. 3 (1895) (Sc. Nt.) 87-.
- Organ (panharmonicon). *Mälzel*, —. Gilbert A. 26 (1807) 214-.
- , enharmonic, Liston's. *Farey*, J. Tilloch Ph. Mg. 37 (1811) 273-; 39 (1812) 373-, 419-.
- , string. (Application of wind to string instruments.) *Hamilton*, J. B. R. I. P. 7 (1875) 488-.
- , —, Hamilton's, mathematical theory. *Bosanquet*, R. H. M. Ph. Mg. 49 (1875) 98-.
- , —, —, —. *Rayleigh*, (Lord). Nt. 11 (1875) 308-.
- , —, —, sounds. *Smith*, Herm. Nt. 11 (1875) 425-.
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- , iron rods to prevent warping of strings. *Presgrave*, D. Beng. J. As. S. 4 (1835) 643-.
- and organ, possibility of combining advantages. *Stoney*, G. J. Dubl. S. Sc. P. 4 (1885) 147-.
- , pedal for, Zacharia's. *Schubring*, G. Halle Z. Nw. 42 (1873) 463-.
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- , experiments. *Weber*, W. E. Pogg. A. 16 (1829) 415-.
- , theory. *Weber*, W. E. Pogg. A. 17 (1829) 193-.
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- — —, communication of sound to air. *Moon*, R. Ph. Mg. 43 (1872) 439-.
- — —, harmonics. *Svanberg*, A. F. Stockh. Öfv. 5 (1848) 29-.
- — —, use of aluminium as sounding-board. *Springer*, A. Am. As. P. (1891) 182.
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- Tom-toms and cymbals, manufacture. *Champion, P., & Riche, A.* C. R. 70 (1870) 85-.
- Violin, aluminium. *Springer, —.* Nt. 50 (1894) 485.
- , segmental vibrations, increase. *Springer, —.* B. A. Rp. (1897) 564.
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- , — (Duhamel). *Cauchy, A. L.* C. R. 10 (1840) 855-.
- , harmonics. *Grüel, C. A.* A. Ps. C. 147 (1872) 627-.
- , sound-post. *Howson, R.* Nt. 28 (1883) 269-, 300.
- , and proportional thickness of strings. *Huggins, W.* R. S. P. 35 (1883) 241-.
- strings, motion. *Helmholtz, H.* [1860] Glasg. Ph. S. P. 5 (1860-64) 17-.
- , unglazed porcelain. *Kosmann, —.* Bresl. Schl. Gs. Jbr. (1888) 21-.
- Wind instruments, air pressure in human lungs during performance on. *Stone, W. H.* L. Ps. S. P. 1 (1876) 13-; Ph. Mg. 48 (1874) 113-.
- , bells of. *Neyreneuf, —.* Caen Ac. Mm. (1891) (Pt. 1) 3-.
- , Bernoulli's theory, proof. *Wheatstone, (Sir) C.* B. A. Rp. (1831-32) 556.

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- Gramophone. *Houston, E. J.* Franklin I. J. 125 (1888) 44-.
- , *Berliner, E.* Franklin I. J. 125 (1888) 425-; 140 (1895) 419-.
- (Berliner's). *Karsten, G.* [1891] Schl.-Holst. Nt. Vr. Schr. 9 (1892) 155-.
- and telephone records, methods of preparation. *Houston, E. J.* Am. Ph. S. P. 25 (1888) 144-.
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- , *Meidinger, —.* D. Nf. Tbl. (1889) 216.
- , *Richard, G.* Lum. Élect. 32 (1889) 358-.
- , improvements. *Riley, C. V.* C. R. 108 (1889) 1280-; 109 (1889) 47.
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- Alphabet, Italian phonographic. *Fautrier, P.* Ven. Aten. 1 (1878) 205-.
- Articulate sounds, wave forms. *Ewing, J. A., & Jenkin, F.* Edinb. R. S. P. 9 (1878) 582-, 714-.
- Artificial production of deep tones analogous to those of human voice. *Cagniard-Latour, C.* C. R. 11 (1840) 703-.
- Consonants. *Hermann, L.* [1900] Pflüg. Arch. Pl. 83 (1901) 1-.
- , *Lloyd, R. J.* Edinb. R. S. P. 22 (1900) 219-.
- , curves. *Hermann, L., & Matthias, F.* Pflüg. Arch. Pl. 58 (1894) 255-.
- , natural arrangement. *Wedgwood, H.* Ph. Mg. 18 (1841) 363-.
- , phonographic study. *Sutherland, A.* [1878] Vict. R. S. T. 15 (1879) 37-.
- , place in scale of tones. *Bezold, —.* Z. Ohrh. 30 (1897) 114-; Arch. Ot. 26 (1897) 383-.
- , spirate fricative. *Lloyd, R. J.* B. A. Rp. (1898) 77-.
- and the telephone. *Blake, C. J.* Am. J. Ot. 1 (1879) 181-.
- Harmonies in vocal tones, experiments on intensity. *Duclshawers, F. V.* Liège S. Sc. Mm. 16 (1890) No. 6, 10 pp.
- Music and declamation. *Burja, —.* Berl. Mm. Ac. (1803) 13-, 32-.
- Phonographic museums and archives. *Azoulay, L.* Rv. Sc. 13 (1900) 712-.
- Phonophotographic experiments. *Hermann, L.* Pflüg. Arch. Pl. 47 (1890) 347-.
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- Forchhammer, G.* Ts. Ps. C. 28 (1889) 289-.
- Richard, G.* Lum. Élect. 32 (1889) 306-; 37 (1890) 509-, 557-; 40 (1891) 512-.
- Johnstone, C. R.* [1890] Sc. S. Arts T. 12 (1891) 355-.
- McKendrick, J. G.* Edinb. R. S. T. 38 (1897) 765-.
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- , *Cariati, G.* Rv. Sc.-Ind. 20 (1888) 278-.
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- , *Gouraud, —.* C. R. 108 (1889) 841-.
- , *Pacinotti, A.* N. Cim. 26 (1889) 249-.
- , *Pernet, J.* Berl. Ps. Gs. Vh. (1889) 77-.
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- , and similar apparatus. *Hermann, —.* Königsb. Schr. 33 (1892) [14]-.
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— — — sounds. *Mauvo*, P. Franklin I. J. 150 (1900) 35-.

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— — —, *Froriep*, L. F. von. *Froriep Not.* 5 (1838) 65-, 81-.

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— — —, glossograph. *Gentilli*, A. Zür. Vjschr. 38 (1893) 371-.

— — —, logograph. *Barlow*, W. H. Pop. Sc. Rv. 13 (1874) 278-; Par. S. Ps. Sé. (1878) 172-.

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- — variations and perception. *Tischer, E.* Ph. Stud. 1 (*1883) 495-.
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- — — — —. *Dolbear, A. E.* Am. J. Ot. 2 (1880) 1-.
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- — — *Toulouse, E., & Vaschide, N. C. R.* 130 (1900) 529-.
- — —, lower, based on telephonic determinations. *Kovács, L., & Kertész, J. (xii) Orv.-Term. Éts.* 5 (1890) (*Orv. Szak*) 125-, 169-.
- — — pitch (low). *Savart, F. A. C.* 47 (1831) 69-.
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- — — *Auerbach, F. A. Ps. C.* 6 (1879) 591-.
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- — — (high). *Schwendt, A. Cg. Int. Md. C. R.* (1900) (*Vol.* 13, *Otol.*) 135-; *Arch. Ohrh.* 49 (1900) 1-.
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- produced by a limited number of impulses. *Kohrausch, W. F. [1879] A. Ps. C.* 10 (1880) 1-.
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- Analysis of tones. *König, W. Frkf. a. M. Ps. Vr. Jbr.* (1894-95) 26.
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- Brass wind instruments as resonators. *Blakley, D. J. L. Ps. S. P.* 2 (1879) 261-; *Ph. Mg.* 6 (1878) 119-.
- Chordometer and tonometer. *Luca, P. A. de. [1827] Mod. S. It. Mm.* 20 (1828) (*Mat.*) 468-.
- Chords, constitution and relations. *Ellis, A. J. R. S. P.* 13 (1864) 392-.
- Consonance and dissonance, combination tones, etc., experiments. *Krueger, F. Ph. Stud.* 16 (1900) 307-, 568-.
- fusion of tones. *Meyer, M. Z. Psychol.* 17 (1898) 401-; 18 (1898) 274-.
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- , theory. *Preyer, W. T. Jena. Sb.* (1878) lxvii-.
- , —, Helmholtz's. *Cross, C. R., & Goodwin, H. M. Am. Ac. P.* 27 (1893) 1-.
- , —, Tyndall's exposition. *Taylor, S. Nt.* 1 (1870) 457-.
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- Cuckoo's cry considered acoustically. *Oppel, J. J. A. Ps. C.* 144 (1872) 307-.
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- — — and production of tones by separate impressions. *Seebeck, A. Pogg. A.* 63 (1844) 368-.
- — —, — theory of siren. *Ohm, G. S. Pogg. A.* 59 (1843) 513-.
- Dissonance, theory. *Barca, A. Padova Mm. Ac.* (1809) 184-.
- Harmonic causation and harmonic echoes. *Smith, Herm. Nt.* 8 (1873) 383-.
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- numbers (2^a , 3^b , 5^c), rôle in physics. *Piar-ron de Mondésir, É. S. Par. Ing. Civ. Mm.* (1881) (1) 276-.
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- , psycho-physical laws. *Vigna*, C. Ven. I. At. (1888-89) 1273-.
- , psychophysiology. *Bonnal*, G. Rv. Sc. 11 (1899) 560-.
- , quantitative applications of laws to fundamental facts. *Mayer*, A. M. Ph. Mg. 49 (1875) 364-.
- system, natural. *Appunn*, A. Wet. Gs. Nt. B. (1889-92) 47-.
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- — vocal tones. *Hensen*, V. Z. Bl. 28 (1891) 39-, 227-.
- Intensity of sound, measurement. *Wien*, M. A. Ps. C. 36 (1889) 834-.
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- Elliott*, E. B. [1878] Smiths. Misc. Col. 20 (1881) Art. 2, 199-. (Wash. Ph. S. Bll. 2 (1880).)
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- Alteration of quality of sounds of siren. *Cagniard-Latour*, C. Par. S. Phlm. PV. (1837) 120-.
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— pitch, fading. *Abraham, O.* Z. Psychol. 20 (1899) 417-.

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Vienna conference for uniform pitch. *Blaserna, P.* Rm. R. Ac. Linc. Rd. 1 (1885) 795-; 2 (1886) (Sem. 1) 71-; 3 (1887) (Sem. 2) 109-.

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Meerens, C. [1876] Gen. I. Nt. Bll. 22 (1877) 187-.

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— — — — — (Ellis). *König, R.* [1877] Am. Ph. S. P. 17 (1878) 80-.

— — —, Scheibler's forks, etc. *Cavaillé-Coll, A.* Nt. 18 (1878) 381-.

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frequency determination. *Clarke, G. S., & McLeod, H.* [1879] Phil. Trans. 171 (1880) 1-.

— — —, *Michelson, A. A.* Am. J. Sc. 25 (1883) 61-.

— — —, *Ellis, A. J.* Nt. 33 (1886) 54-.

— — —, absolute. *Oppolzer, T. (Ritter) von.* Wien Az. 23 (1886) 82-.

— — —, ancient. *Govi, G.* C. R. 51 (1860) 450-.

— — —, by Hipp's chronoscope. *Lang, V. von.* [1885] Wien Az. 22 (1885) 221-; *Exner Rpm.* 22 (1886) 129-.

— — —, and simple chronoscope. *Mayer, A. M.* Wash. Nat. Ac. Mm. 3 (Pt. 1) (1885) 45-, (Pt. 2) (1886) 167-.

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